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PERMANENT INTERNATIONAL ASSOCIATION
OF ROAD CONGRESSES

General Secretary's Office: 1, Avenue d'Iéna, Paris

SIXTH
INTERNATIONAL ROAD CONGRESS

WASHINGTON, D. C., 1930

PROCEEDINGS
of the
CONGRESS

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1931



HERBERT HOOVER
PRESIDENT OF THE UNITED STATES

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THE CONGRESS EMBLEM
WORN AS A LAPEL BUTTON BY DELEGATES

I. INTRODUCTION

At the closing session of the Fifth International Congress held at Milan in 1926, Mr. Thomas H. MacDonald, delegate of the United States Government, had expressed the hope of seeing the Sixth Congress held in his country. This invitation was later officially presented by Mr. Roy D. Chapin at the annual meeting of the Permanent International Commission of Road Congresses in 1927, and was unanimously accepted by the commission during its session of June 30, 1928.

The American Organizing Commission, whose membership is given elsewhere in this report, was thereupon formed by the chief technical authorities of the United States and the great American associations interested in road problems, under the chairmanship of Mr. Roy D. Chapin, of the National Automobile Chamber of Commerce and member of the Permanent International Commission, with, as Secretary General, Mr. Thomas H. MacDonald, Chief of the United States Bureau of Public Roads.

The technical program of the Sixth Congress had been discussed during the meeting of the Permanent International Commission on June 25, 1927; and it was finally completed after agreement between the executive bureau and the American Organizing Commission.

On August 1, 1928, the technical program was sent to the members of the permanent bureau charged with the responsibility, in their respective countries, of designating reporters. One hundred and seventy-seven reporters, of 18 different nationalities, accepted the mission which had been given them to present reports (individually or in collaboration) to the Sixth Congress. The number of reports thus promised was 89, but some reporters having found themselves unable to perform the work or to submit their report in time, the number of papers actually submitted was 69. In addition, four other reports, a list of which will be found in Chapter IV of this report, arrived too late to be printed; the manuscripts have been placed in the library of the association.

Despite the considerable delays which were entailed by the translation and printing of the reports, and which were increased by the time required for correspondence between the executive bureau at Paris and the local commission at Washington, it was found possible to distribute the reports two months before the opening of the Con-

gress, and the conclusions of the general reporters about three weeks after distribution of the reports; only those members whose applications arrived very late failed to receive reports in ample time.

Translation and printing of the reports in the French and German languages were furnished by the executive bureau, and translation and printing in English and Spanish by the American Organizing Commission.

A copy of the full set of reports was given at the opening of the Congress in Washington to all members who stated that they had not received them before their departure from their homes.

The American commission has worked tirelessly and with ardor, and has been able to surmount all obstacles and terminate successfully its difficult task. It deserves the gratitude of all the congressists, notably because of the care taken in organizing the meetings; the discussion was conducted in perfect order and was followed simultaneously in four languages by those present, thanks to the use of individual telephone receivers which each congressist found at his seat. The American commission conducted a most active and efficacious propaganda; in accord with the executive bureau, a preliminary circular was published by the commission under date of January 15, 1930, and widely circulated among all who might be interested in road questions.

This circular indicated:

General program of the Congress:

Conditions to be fulfilled for participation in the Congress:

*Special facilities of travel accorded to the congressists both upon the railroads of various countries and upon the steamship lines serving the United States:*¹

A list of hotels with their prices:

Project for an international exposition of road machinery;

All-expense tours following the Congress;

Various information concerning the distribution of cards to participating members, sending of documents before and during the Congress, etc.

This circular was later followed by a second published July 1, 1930, indicating the program and the place of the Congress, the dress required for the fêtes and receptions, and supplementary information upon travel facilities and the formalities to be complied with in entering the United States.

A pamphlet supplying details of all-expense tours organized to follow the Congress under the auspices of the American Automobile Association had been distributed with the first circular. In addition,

¹ The executive bureau is happy to express its thanks here to the steamship and railroad companies which have given the congressists substantial reductions in rates and thus permitted a larger number to make the journey to the United States.

three tours, arranged by the Highway Education Board, with the assistance of the principal American organizations interested in road problems, were offered—by individual invitation—to the official delegates of the Governments.

The propaganda thus made concertedly by the American commission and the executive bureau, and with the assistance in Great Britain of the British Committee of the Association, produced material results, as the table presented herewith shows.

The number of Governments officially enrolled was 85, of which 64 were represented at the Congress. As regards corporations and individual members, the total number of those enrolled amounted to 3,380. One thousand delegates were present.

At its meeting of October 6, 1930, held immediately before the opening of the Congress, the permanent bureau of the Permanent International Commission proceeded, pursuant to Article V of its regulations, with the nomination of the general bureau and the sectional bureaus.

The executive bureau of the association nominated Mr. Roy D. Chapin as President General of the Sixth Congress and Mr. Thomas H. MacDonald as Secretary General. These nominations were approved by acclamation.

The official opening session of the Congress, on the afternoon of October 6, 1930, took place in Constitution Hall at Washington: the meetings of the sections, the plenary session for final action upon the work of the sections, and the official closing session of the Congress, were held in the building of the Chamber of Commerce of the United States. The official opening session was presided over by the Hon. Henry L. Stimson, Secretary of State, accompanied by the Hon. Arthur M. Hyde, Secretary of Agriculture. The official closing session was under the presidency of Mr. Roy D. Chapin, President General of the Congress.

As in the preceding congresses, the work was divided between two sections whose deliberations were pursued simultaneously. The discussions, perfectly directed, always courteous, and easy to follow in the four official languages, thanks to the use of microphones and individual telephone receivers, ended in a vote upon the conclusions which the plenary assembly ratified in its meeting of October 10. These conclusions are printed in extenso elsewhere in this report.

Most interesting excursions were organized during and after these sessions, and brilliant receptions were offered to the congressists, reports of which are given in other chapters of this book.

At the closing session very warm thanks and felicitations were addressed to the President General, Mr. Roy D. Chapin, to the Secretary General, Mr. Thomas H. MacDonald, and to their col-

laborators by the spokesmen of the nations represented. The executive bureau of the Permanent International Association of Road Congresses, which expressed itself to this effect at Washington, here renews its congratulations and its thanks to all these gentlemen.

The Sixth International Road Congress was an extremely brilliant one; and all those who were able to take part will retain a lasting remembrance of it.

Finally, it is appropriate to make note of the International Exposition of Road Machinery which was held under the auspices of the American Road Builders' Association during the Congress. This exposition, installed in the Washington Auditorium, was participated in by numerous firms or organizations of various countries engaged in construction or maintenance of highways and allied lines. It also included demonstrations of machinery. The reader will find a special chapter in this book relating to this exposition. Particular felicitations should be addressed to the organizers of this technical manifestation, in which numerous firms and organizations took part, the list of which is given elsewhere.

II. STATISTICAL TABLE OF MEMBERS OF THE CONGRESS

Serial No.	Nationalities represented at the Congress	Number of delegates—				Number of members			Total number of the authorized members of the Congress
		Of govern-ments—		Of corpora-tions—		Do-nors	Perma-nent (mem-bers of the asso-cia-tion)	Tem-porary (mem-bers of the Sixth Con-gress only)	
		To the Perma-nent Inter-national Com-mis-sion and Sixth Con-gress	To the Sixth Con-gress only	Perma-nent mem-bers	Tem-porary mem-bers				
1	French Equatorial Africa.....		1						1
2	French Western Africa.....	1							1
3	Union of South Africa.....		1	4			1	2	8
4	Alaska.....			1				1	2
5	Algeria.....	1	1	3			3		6
6	Germany.....	15	5	13			15	28	76
7	British West Indies.....		2				1	6	9
8	Argentina.....	1	2	5			28	12	48
9	Australia.....		3	6			5	5	19
10	Austria.....	1	4	3			10	3	21
11	Belgium.....	6	1	34			59	5	105
12	Bolivia.....		4						4
13	Brazil.....	2	3	6			18	3	32
14	Bulgaria.....	1						4	5
15	Canada.....		11	4			3	17	35
16	Chile.....	1	4	2			5		12
17	China.....	1	5	1			8	7	22
18	Colombia.....		2						2
19	Belgian Congo.....						1		1
20	Costa Rica.....		1						1
21	Cuba.....	1	3	1			3	7	15
22	Denmark.....	1	3	10			10		30
23	Danzig.....						1		1
24	Dominican Republle.....		1						1
25	Egypt.....	1		1			8	1	11
26	Ecuador.....		1						1
27	Spain.....	5	8	15			47	13	88
28	United States.....	15	40	46	9	4	166	614	894
29	Ethiopia.....	1							1
30	Finland.....	1	1	2			2		6
31	France.....	15	22	192		1	264	18	512
32	Great Britain.....	4	36	117			211	63	431
33	Greece.....	1	2	11			14	1	29
34	Guatemala.....		3						3
35	Haiti.....		1						1
36	Honduras.....		1						1
37	Hong Kong.....		1						1
38	Hungary.....	1	1	9			14	3	28
39	British India.....		5	7			9		21
40	Dutch Indies.....	1	1	4			2		8
41	French India.....	1	1						2
42	Indo-China.....	1	1	3					7
43	Irish Free State.....	1					3		4
44	Northern Ireland.....	1	1						2
45	Italy.....	7	5	28			60	14	123
46	Japan.....	1	4	2			17	5	29
47	Latvia.....						1		1
48	Lithuania.....	1							1
49	Luxemburg.....	1		2			6		9
50	Madagascar.....		1						1
51	Morocco.....	1	2	4			4		11
52	Martinique.....							1	1
53	Mexico.....	1	2	1			2	4	10
54	Monaco.....			1			3		6

II. Statistical table of Members of the Congress—Continued

Serial No.	Nationalities represented at the Congress	Number of delegates--				Number of members			Total number of the authorized members of the Congress
		Of governments--	Of corporations--	Do not	Permanent (members of the association)	Temporary (members of the Sixth Congress only)			
							To the Permanent International Commission and Sixth Congress	To the Sixth Congress only	
55	Nigeria.....		1						1
56	Norway.....	1	3	2			2	2	10
57	New Caledonia.....		1						1
58	New Zealand.....		1				1	2	4
59	Nyasaland.....			1			1		1
60	Palestine.....						1	1	3
61	Panama.....		1						2
62	Paraguay.....		1				1		2
63	Netherlands.....	1	4	11			61	4	81
64	Peru.....		1				2		3
65	Persia.....		2				3		4
66	Philippine Islands.....		2	2			5	1	10
67	Poland.....	1	2	9			151	2	163
68	Portugal.....	1	2	7			63		73
69	Rumania.....	2	4	7			23	3	39
70	San Salvador.....		3						3
71	Sarre Territory.....	1							1
72	Senegal.....						1		1
73	Siam.....	1	2				2		5
74	British Sudan.....		2						2
75	League of Nations.....	1	1						2
76	Sweden.....	1		7			69	3	80
77	Switzerland.....	3	4	17			23	3	50
78	Syria.....	1		2			3		6
79	Czechoslovakia.....	1	1	10			16	6	65
80	Newfoundland.....		1						1
81	Tunis.....	1	1	10			1		13
82	Turkey.....						1		1
83	Union of Socialist Soviet Republics.....			1			16		17
84	Uruguay.....	1	3	1			17		22
85	Venezuela.....		3					2	5
86	Yugoslavia.....	1	2	1			1		5
	Total.....	113	215	626	9	5	1,516	867	3,391



HENRY L. STIMSON
SECRETARY OF STATE OF THE UNITED STATES

III. AMERICAN ORGANIZING COMMISSION

HONORARY COMMITTEE

THE PRESIDENT OF THE UNITED STATES
THE SECRETARY OF STATE
THE SECRETARY OF THE TREASURY
THE SECRETARY OF WAR
THE ATTORNEY GENERAL
THE POSTMASTER GENERAL
THE SECRETARY OF THE NAVY
THE SECRETARY OF THE INTERIOR
THE SECRETARY OF AGRICULTURE
THE SECRETARY OF COMMERCE
THE SECRETARY OF LABOR
CHAIRMAN, FOREIGN RELATIONS COMMITTEE, UNITED STATES SENATE
CHAIRMAN, COMMITTEE ON POST OFFICES AND POST ROADS, UNITED STATES SENATE
CHAIRMAN, COMMITTEE ON FOREIGN AFFAIRS, HOUSE OF REPRESENTATIVES
CHAIRMAN, COMMITTEE ON ROADS, HOUSE OF REPRESENTATIVES

EXECUTIVE OFFICERS

PRESIDENT
ROY D. CHAPIN
NATIONAL AUTOMOBILE CHAMBER OF COMMERCE
SECRETARY GENERAL
THOMAS H. MACDONALD
CHIEF, UNITED STATES BUREAU OF PUBLIC ROADS
WILBUR J. CAHR, DEPARTMENT OF STATE
A. J. BROSSÉAU, CHAMBER OF COMMERCE OF THE UNITED STATES
H. H. RICE, HIGHWAY EDUCATION BOARD
ROBERT HOOPER, AMERICAN AUTOMOBILE ASSOCIATION
H. G. SHIRLEY, AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS
THOMAS R. TAYLOR, DEPARTMENT OF COMMERCE
CHARLES M. UPHAM, AMERICAN ROAD BUILDERS' ASSOCIATION
ADMINISTRATIVE AIDES
PYKE JOHNSON
NATIONAL AUTOMOBILE CHAMBER OF COMMERCE
H. S. FAIRBANK
UNITED STATES BUREAU OF PUBLIC ROADS
E. W. JAMES
UNITED STATES BUREAU OF PUBLIC ROADS
MANAGER OF THE CONGRESS
J. TRUEMAN THOMPSON

PATRON ORGANIZATIONS

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS	NATIONAL AUTOMOBILE CHAMBER OF COMMERCE
AMERICAN AUTOMOBILE ASSOCIATION	NATIONAL CRUSHED STONE ASSOCIATION
AMERICAN PETROLEUM INSTITUTE	NATIONAL PAVING BRICK MANUFACTURERS' ASSOCIATION
AMERICAN ROAD BUILDERS' ASSOCIATION	NATIONAL SAND AND GRAVEL ASSOCIATION
AMERICAN SOCIETY FOR TESTING MATERIALS	NATIONAL SLAG ASSOCIATION
AMERICAN SOCIETY OF CIVIL ENGINEERS	PORTLAND CEMENT ASSOCIATION
CHAMBER OF COMMERCE OF THE UNITED STATES OF AMERICA	RUBBER MANUFACTURERS' ASSOCIATION
HIGHWAY EDUCATION BOARD	SOCIETY FOR PROMOTION OF ENGINEERING EDUCATION
HIGHWAY RESEARCH BOARD, NATIONAL RESEARCH COUNCIL	SOCIETY OF AUTOMOTIVE ENGINEERS (INC.)
MOTOR AND EQUIPMENT ASSOCIATION	THE ASPHALT INSTITUTE

IV. PROGRAM OF THE SUBJECTS AND NAMES OF THE REPORTERS

FIRST SECTION.—CONSTRUCTION AND MAINTENANCE

FIRST QUESTION: RESULTS OBTAINED BY THE USE OF—(A) CEMENT; (B) BRICK OR OTHER ARTIFICIAL PAVING. (METHODS EMPLOYED FOR ROAD CONSTRUCTION AND MAINTENANCE IN THESE MATERIALS)

GENERAL REPORTERS

Frank T. Sheets, Chief Highway Engineer, Department of Public Works and Buildings of Illinois.

P. J. Freeman, Chief Engineer, Bureau of Tests and Specifications, Allegheny County Department of Public Works, Pennsylvania.

REPORTERS

Germany, 1-A:¹

Vilbig, Ministerialrat, Bayerisches Staatsministerium des Innern, München.

Dr. Maier, Baudirektor, Stuttgart.

Müller, Landesbaurat, Provinz Westfalen, Münster i. W.

Prof. Otzen, Geh. Reg. Rat, Technische Hochschule, Hannover.

Riepert, Baurat Dr. Ing., Charlottenburg.

Belgium, 1-C: E. Van Hauwermeiren, Ingénieur des Ponts et Chaussées, Bruxelles.

Denmark, 1-E:

S. Ellert, County Engineer, Holbaek.

E. Suenson, Professor, Copenhagen.

P. Ørum, Chief Engineer, A/S. Danalith, Copenhagen.

Spain, 1-G:

José Rodríguez Spiteri, Ingeniero en Jefe de Caminos, Canales y Puertos, Malaga.

Francisco de Albacete, Ingeniero en Jefe de la Provincia de Madrid.

United States, 1-H:

PART A

Frank T. Sheets, Chief Highway Engineer, Department of Public Works and Buildings of Illinois.

Roy W. Crum, Director, Highway Research Board, National Academy of Sciences.

E. M. Fleming, Manager, Highways and Municipal Bureau, Portland Cement Association.

Arthur N. Johnson, Dean, College of Engineering, University of Maryland.

Clifford Older, Consulting Engineer, Chicago, Ill.

Raymond E. Tombs, District Engineer, United States Bureau of Public Roads.

¹ The reports to the Congress are designated by a number, indicating the question on which the report is written and a letter indicating the country of the author. The countries are given letters in the order of their arrangement in the French language.

PART B

William H. Connell, Executive Director, Regional Planning Federation of the Philadelphia Tri-State District.

Perry J. Freeman, Chief Engineer, Bureau of Tests and Specifications, Allegheny County Department of Public Works, Pennsylvania.

John B. Hittell, Chief Engineer of Streets, Chicago, Ill.

Earl F. Kelley, Chief, Division of Tests, United States Bureau of Public Roads.

Clarence D. Pollock, Consulting Engineer, New York City.

France, 1-J:

R. Bontteville, Ingénieur en Chef des Ponts et Chaussées, Chef du Service Technique de la Voie Publique, de l'Eclairage et du Nettoyement de la Ville de Paris.

Great Britain, 1-K:

PART A

J. R. L. Meek, M. Inst. C. E., City Engineer, Manchester.

D. A. Donald, M. Inst. M. and Cy. E., Chief Engineer of the Glasgow-Edinburgh Road, Glasgow.

S. H. Morgan, M. C., M. Inst. C. E., Borough Surveyor, Rochdale County Borough Council, Rochdale.

Maj. R. A. B. Smith, M. C., A. M. Inst. C. E., The British Portland Cement Association, Westminster.

PART II

Ambrose W. Cross, Chartered Civil Engineer, Midland Brick Association.

E. A. Evans, F. S. I., Assoc. M. Inst. C. E., County Engineer, Denbigh.

S. McPherson, General Secretary, the Institute of Quarrying.

R. S. Murt, Assoc. M. Inst. C. E., Chartered Civil Engineer, County Surveyor, Stafford.

James Lang, C. E., Surveyor to the Kilmarnock District Committee, Ayrshire County Council.

Lieut. Col. T. H. Chapman, O. B. E., Rubber Growers' Association.

Irish Free State, 1-M, James Quigley, Chief Engineer, Roads, Saorstad Eireann, Dublin.

Italy, 1-N:

L. Del Gaudio, Ispettore Superiore dell'Azienda Autonoma Statale della Strada.

F. Colamonico, Ispettore Superiore del R. Genio Civile.

J. Vandone, Direttore dell'Istituto Sperimentale Stradale del Touring Club Italiano e del Reale Automobile Club d'Italia.

Holland, 1-O:

P. W. Scharroo, Commandant of Engineering of the Army, Holland.

Engineer J. W. Clerx, Chief Engineer of Roads of the City of Amsterdam.

Poland, 1-Q, Jerzy Murynowski, Engineer, Director of the National Paving Brick Factories of Poland.

Sweden, 1-R, E. Paul Wretling, Engineer of Roads and Bridges, Director of the Limited Company "Vägförbättringsår," Stockholm.

Switzerland, 1-S, E. Wydler, Kantonsingenieur, Aarau.

SECOND QUESTION: THE MOST RECENT METHODS ADOPTED FOR THE USE OF
TAR, BITUMEN, AND ASPHALT IN ROAD CONSTRUCTION

GENERAL REPORTER

Roy W. Crum, Director, Highway Research Board, National Academy of
Sciences

REPORTERS

Germany, 2-A:

Professor Dr. Neumann, Technische Hochschule, Stuttgart.

Landesbauamt Grulich, Provinz Sachsen, Merseburg.

Magistrats-Oberbauamt Dr. P. Hermann, Charlottenburg.

Oberbauamt Kluge, Sächsisches Finanzministerium, Dresden.

Privatdozent Dr. Mallison, Technische Hochschule, Berlin.

Belgium, 2-C, E. Van Volsem, Ingénieur en Chef des Ponts et Chaussées, Liege.

Denmark, 2-E:

S. Ellert, County Engineer, Holbaek.

E. Suhr, Chief Engineer in Road Department, Gentofte.

Spain, 2-G, El Conde de Casa Rui, Professor, School of Bridges and Highways,
Madrid.

United States, 2-H:

A. W. Dean, Chief Engineer, Massachusetts Department of Public Works.

R. H. Baldoek, Maintenance Engineer, State Highway Commission of
Oregon.

G. H. Henderson, Chief Engineer, State Board of Public Roads of Rhode
Island.

Prevost Hubbard, Chemical Engineer, the Asphalt Institute.

Charles H. Moorefield, State Highway Engineer, South Carolina.

France, 2-J, E. Jeannin, Ingénieur en Chef des Ponts et Chaussées, Orléans.

Great Britain, 2-K:

E. J. Elford, M. Inst. C. E., Borough Engineer of Wandsworth, London.

Prof. R. G. H. Clements, M. Inst. C. E., Consulting Engineer, London.

H. R. Hepworth, A. M. Inst. C. E., County Surveyor, West Riding of
Yorkshire County Council, Wakefield.

J. Kilpatrick, The South Western Tar Distilleries, Portsmouth.

T. G. Marriott, The Limmer and Trinidad Lake Asphalt Co., Ltd., London.

Irish Free State, 2-M, James Quigley, Chief Engineer, Roads, Saorstad Eireann,
Dublin.

Italy, 2-N:

Ing. Ersilio Marchi, Superior Inspector of the Azienda Autonoma, Statale
della Strada.

Ing. Giuseppe Sbrulevich, Chief Engineer of the Province of Milan.

Ing. Ugo Conte, Chief Engineer of the Highway Service of the Government
of Rome.

Holland, 2-O:

Dr. F. J. Nellensteyn, Chief of Government Road Laboratory, Delft,
Holland.

R. Loman, Engineer of Roads and Bridges, The Hague, Holland.

Siam, 2-P, Luang Prinyayogavibulja, B. Sc., A. C. G. I., Assoc. M. Inst. C. E.,
Department of Ways, Bangkok (Siam).

Sweden, 2-R, K. Josef Gendt, Chief Engineer of the Nya Asfalt Aktiebolaget,
Stockholm.

Switzerland, 2-S, K. Keller, Kantonsingenieur, Zürich.

12 PROCEEDINGS OF SIXTH INTERNATIONAL ROAD CONGRESS

THIRD QUESTION: THE CONSTRUCTION OF ROADS IN NEW COUNTRIES, SUCH AS COLONIES AND UNDEVELOPED REGIONS

GENERAL REPORTER

Edwin W. James, Chief, Division of Highway Transport, United States Bureau of Public Roads.

REPORTERS

Germany, 3-A:

Geheimer Regierungsrat Prof. Dr. Ing. E. H. J. Brix, Technische Hochschule Berlin-Charlottenburg.

Oberregierungsbaurat Otto Ertl, Vorstand des Strassen-und-Flussbauamtes, Weilheim.

Magistratsoberbaurat Regierungsbaumeister a. D. Dr. Scheuermann, Wiesbaden.

Argentine Republic, 3-B. Roberto Kurtz, Miembro de la Sociedad Americana de Ingenieros Civiles, Ex-Secretario General del Primer Congreso Panamericano de Carreteras, Secretario de la Sección Argentina del Congreso Permanente Panamericano de Carreteras, Jefe de Sección adscripto a la Dirección General de Puentes y Caminos de la Nación.

Cuba, 3-D, F. J. De Sola, Ingeniero en Jefe de la V División, Nueva Carretera Central, Camagüey (Cuba).

United States, 3-E:

PART A.—THE CONSTRUCTION OF ROADS IN WELL-SETTLED AGRICULTURAL SECTIONS

F. R. White, Chief Engineer, Iowa State Highway Commission.

C. M. Babcock, Commissioner of Highways, Minnesota Department of Highways.

Gibb Gilchrist, State Highway Engineer of Texas.

PART B.—THE CONSTRUCTION OF ROADS IN AGRICULTURAL SECTIONS, SPARSELY SETTLED

L. I. Hewes, Deputy Engineer, United States Bureau of Public Roads.

Henry H. Blood, Chairman, State Highway Commission of Utah.

C. H. Purcell, State Highway Engineer, State Highway Commission of California.

Z. E. Severson, State Highway Engineer, State Highway Department of Wyoming.

W. N. Frickstad, Senior Highway Engineer, United States Bureau of Public Roads.

Finland, 3-I, E. W. Skogstrom, Director General of the Central Administration of Roads and Hydrotechnic Works, Helsingfors.

France, 3-J:

M. Vicaire, Inspecteur Général des Ponts et Chaussées à Alger.

M. Gubland, Inspecteur Général des Travaux Publics des Colonies, à Paris.

Great Britain, 3-K:

Maj. Robert Bruce, M. Inst. C. E., Chief Engineer, Perth-Inverness Road.

Lieut. Col. R. W. Butler, A. M. Inst. C. E., Ministry of Transport.

A. J. Hope, Esq., C. I. E., representing the Government of India.

J. W. Spiller, Esq., M. Inst. C. E., representing the Crown Agents for the Colonies.

Maj. S. E. Warren, A. M. Inst. C. E., County Surveyor of Norfolk.

Italy, 3-N:

Rocco Lanzi, Engineer, Superior Inspector of the Azienda Autonoma Statale della Strada, Rome.

Lodovico Bonamico, Engineer, Chief Engineer of Civil Engineering, Rome.

Alfredo Strada, Engineer, Chief Engineer, Reggio.

Holland, 3-O: Jhr. W. M. De Jonge, Chief Engineer of Waterways, Province of Drenthe.

Siam, 3-P: Luang Prinayogavibulyn, B. Sc., A. C. G. I., A. M. Inst. C. E., Department of Ways, Bangkok.

Poland, 3-Q:

Ingenieur Leon Barowski, Leiter der Weg-Abteilung der Direktion für öffentliche Arbeiten der Wojewodschaft Warschau.

Ingenieur Alexander Gajkowiez, Leiter der Strassen-Bezirksverwaltung in Pultusk.

Ingenieur Jan Moszynski, Direktor für öffentliche Arbeiten der Wojewodschaft Polesie.

Ingenieur Alexander Zubelewicz, Direktor für öffentliche Arbeiten der Wojewodschaft Nowogródek.

Sweden, 3-R: Einar G. Almqvist, Civil Engineer, Lieutenant Royal Corps of Engineers, Stockholm.

SECOND SECTION.—TRAFFIC AND ADMINISTRATION

FOURTH QUESTION: WAYS AND MEANS OF FINANCING HIGHWAYS—(A) ROAD CONSTRUCTION; (B) MAINTENANCE

GENERAL REPORTER

Col. A. B. Barber, Manager of Transportation and Communication Department, Chamber of Commerce of the United States of America

REPORTERS

Germany, 4-A:

Ministerialdirigent Geh. Ob. Reg. Rat Dr. Hellrich, Preuss. Ministerium f. Landw., Dom. u. Forsten.

Min. Direktor Dr. Fuchs, Fin. Min., Karlsruhe.

Verbandsdirektor Dr. Schmidt, Städt. Verband Ruhrkohlenbezirk, Essen.

Min. Rat u. D. v. Schenck, Verband der Preuss. Provinzen, Berlin.

Beigeordneter Dr. Heymann, Deutscher Landkreistag, Berlin.

Stadtkamrat Dr. Leske, Dresden.

Denmark, 4-E:

Prof. A. R. Christensen, Copenhagen.

J. D. Jespersen, Surveyor of County Roads.

Spain, 4-G: José Rodríguez Spiteri, Ingeniero Jefe de Caminos, Canales y Puertos; Jefe de Obras Públicas, Málaga.

United States, 4-H:

Henry R. Trumbower, Economist, University of Wisconsin.

Roy D. Chapin, Chairman, Highway Committee, National Automobile Chamber of Commerce and Chairman of the Board, Hudson Motor Car Co.

M. W. Tarkelson, Director of Regional Planning, State Highway Commission of Wisconsin.

France, 4-J, M. Lippmann, Ingénieur en chef des Ponts et Chaussées à Paris.

Great Britain, 4-K:

Arthur Collins, London.

W. Rees Jeffreys, Chairman, The Roads Improvement Association, London.
Irish Free State, 4-M, James Quigley, Chief Engineer, Roads, Saorstad
Eireann, Dublin.

Italy, 4-N:

Michele Carlo Isacco, Counselor of State, Rome.

Francesco La Farina, Chief of the Administrative Services of the Azienda
Autonoma Statale della Strada, Rome.

Paride Andrioli, Chief of the Service of Accounts of the Azienda Auto-
noma Statale della Strada, Rome.

Holland, 4-O:

G. J. van den Broek, Chief Engineer of Roads and Bridges, The Hague.

J. M. H. R. Kersebaekers, Chief Engineer of the Province of North
Brabant, Bois-le-Duc.

Siam, 4-P, Luang Prinyayogavibulyn, B. Sc., A. C. G. I., A. M. Inst. C. E.,
Department of Ways, Bangkok.

Sweden, 4-R, K. K. Adler, Captain, Bridge and Road Corps, Linköping.

FIFTH QUESTION: HIGHWAY TRANSPORT—CORRELATION AND COORDINATION
WITH OTHER METHODS OF TRANSPORT; ADAPATION TO COLLECTIVE (ORGAN-
IZATIONS) AND INDIVIDUAL USES

GENERAL REPORTER

Henry R. Trumbower, Economist, University of Wisconsin.

REPORTERS

Germany, 5-A:

Euting, Präsident, Württ. Innenministerium, Stuttgart.

Dr. Speck, Ministerialrat, Sächsisches Finanzministerium, Dresden.

Dr. Leo, Oberlanddirektor, Hamburg.

Dr. Blum, Professor, Technische Hochschule, Hannover.

Halter, Professor, Technische Hochschule, München.

Sussdorf, Regierungsrat a. D., Kraftverkehr Deutschland, Berlin.

United States, 5-II:

Thos. H. MacDonald, Chief, United States Bureau of Public Roads.

Alfred J. Brosseau, Vice President Chamber of Commerce of the United
States and President Mack Trucks (Inc.).

Ralph Budd, President Great Northern Railway Co. and President North-
land Transportation Co.

France, 5-J:

M. Delemer, Ingénieur en Chef des Ponts et Chaussées au Ministère des
Travaux Publics à Paris.

M. Pourcel, Ingénieur en Chef adjoint à la Direction des Chemins de fer
P. L. M. à Paris.

Great Britain, 5-K:

Sir Henry P. Maybury, G. B. E., K. C. M. G., C. B., M. Inst. C. E., J. P.,
Consulting Engineer to the Minister of Transport, and Chairman of the
London and Home Counties Traffic Advisory Committee.

James Milne, Esq., General Manager of the Great Western Railway Co.
Frank Hick, Esq., Managing Director of the London Underground Group
of Companies.

E. S. Shrapnell-Smith, Esq., C. B. E., M. Inst. T., Past President of the
Commercial Motor Users Association (Inc.).

Italy, 5-N:

Felice Fiori, Capo Servizio delle Ferrovie dello Stato, Roma.

Filippo Madonini, Capo Compartimento della Viabilità dell' Azienda Autonoma Statale della Strada, Milano.

Ferruccio Vezzani, Ispettore principale dell' Ispettorato Generale delle Ferrovie, Tramvie ed Automobili, Roma.

Siam, 5-P, Luang Prinnyogavibulaya, B. Sc., A. C. G. I., A. M. Inst. C. E., Department of Ways, Bangkok.

Switzerland, 5-S, Rob. Hohl, Ingénieur, Subdirektor der "SESA" Schweizerische Express A. G., Zürich.

Czechoslovakia, 5-T, Vojtech Mixa, Secretary of the Central Association of Czechoslovakian Industry.

SIXTH QUESTION: 1. TRAFFIC REGULATION IN LARGE CITIES AND THEIR SUBURBS; TRAFFIC SIGNALS; DESIGN AND LAYOUT OF ROADS AND ADAPTATION TO TRAFFIC REQUIREMENTS IN BUILT-UP AREAS. 2. PARKING AND GARAGING OF VEHICLES

GENERAL REPORTER

Miller McClintock, Director, Albert Russel Erskine Bureau, Harvard University.

REPORTERS

Germany, 6-A:

Oberregierungsrat Paetsch, Preussisches Ministerium des Innern, Berlin.

Magistratsoberhauptmann Löschmann, Berlin.

Regierungs- und Bauamt Schuppan, Polizeipräsident, Berlin.

Stadtbaurat Professor Ehlgötz, Technische Hochschule, Berlin.

Privatdozent Dr. Müller, Technische Hochschule, Berlin.

Argentine Republic, 6-B, Juan Agustín Vuille, Civil Engineer, Chief of the Office of Highway Investigations, National Department of Bridges and Roads.

Belgium, 6-C:

G. Luyssen, Ingénieur Principal des Ponts et Chaussées.

J. Hansez, Membre du Comité de Direction du Conseil Supérieur de la Route, Président de la Commission Internationale de la Circulation (A. I. A.).

Denmark, 6-E, H. V. Rygner, Chief Engineer, City of Odense.

United States, 6-H:

Col. A. B. Barber, Chamber of Commerce of the United States.

Miller McClintock, Director, Albert Russel Erskine Bureau, Harvard University.

Robert Kingery, General Manager, Chicago Regional Planning Association.

John A. Macdonald, Commissioner, State Highway Department of Connecticut.

Jay Downer, Chief Engineer, Westchester Park Commission.

France, 6-J:

E. Lorienx, Inspector Général des Ponts et Chaussées, Président de la 1ère Section du Conseil Général des Ponts et Chaussées, Paris.

H. Giraud, Directeur Général des Travaux de Paris.

Great Britain, 6-K:

Mr. Alderman W. G. Davie, J. P.

F. L. D. Elliott, Esq., C. B., Assistant Commissioner, Metropolitan Police, Scotland Yard, London.

T. Pierson Frank, Esq., M. Inst. C. E., F. S. I., City Engineer, Liverpool.

J. S. Pool-Godsell, Esq., O. B. E., M. B. E., Assistant Secretary, Ministry of Transport.

16 PROCEEDINGS OF SIXTH INTERNATIONAL ROAD CONGRESS

Parker Morris, Esq., LL. B., Town Clerk, Westminster City Council.

Sir John Pakenham, C. B. E.

G. L. Pepler, Esq., F. S. I., Chief Town Planning Inspector, Ministry of Health.

Italy G-N:

Ing. Comm. Enrico Mellini, Ispettore Capo dell' Ispettorato Generale delle Ferrovie, Tramvie ed Automobili, Roma.

Ing. Cav. Uff. Ugo Baselli, Ing. Capo dell' Ufficio Tecnico Municipale di Milano.

Marchese Avv. Paolo Sonni Picenardi, Direttore Generale del Reale Automobile Club d'Italia, Roma.

Poland, G-Q. Ignacy Drexler, Engineer, Professor of City Management of the Polytechnic School at Lwów.

Sweden, G-R. Carl Gustav Bergman, Captain of the Road and Bridge Corps, Stockholm.

Switzerland, G-S:

Werner Müller, Polizeikommissär, Bern.

Armin Reber, Stadtingenieur, Bern.

Czechoslovakia, G-T, M. Milos Vanecek, Engineer and Professor in the Technical High School of Prague.

REPORTS RECEIVED TOO LATE TO BE PUBLISHED, MANUSCRIPTS OF WHICH HAVE BEEN PLACED IN THE LIBRARY OF THE ASSOCIATION

FIRST QUESTION: RESULTS OBTAINED BY THE USE OF CEMENT

Venezuela, Francisco J. Sucre, Ingeniero Civil del Ministerio de Obras Públicas, Caracas.

SECOND QUESTION: THE MOST RECENT METHODS ADOPTED FOR THE USE OF TAR, BITUMEN, AND ASPHALT IN ROAD CONSTRUCTION

U. S. S. R.:

Ivanoff, Engineer, Assistant Director of the Automobile Road Research Institute of the People's Commissariat for Ways of Communication, Central Department of Local Transport.

Mezerina, in charge of the Bitumen Laboratory of the Automobile Road Research Institute of the P. C. for Ways of Communication.

Venezuela, Francisco J. Sucre, Ingeniero Civil del Ministerio de Obras Públicas, Caracas.

THIRD QUESTION: THE CONSTRUCTION OF ROADS IN NEW COUNTRIES SUCH AS COLONIES AND UNDEVELOPED REGIONS

U. S. S. R.:

M. Dinelier, Professor, Director of the Automobile Road Research Institute of the People's Central Department of Local Transport.

Zemluchensky, Professor in charge of the Laboratory of the Automobile Road Research Institute of the People's Commissariat for Ways of Communication.

Anokhin, Engineer, Chief of the Economic and Road Research Section of the Regional Highway Department.



ARTHUR M. HYDE
SECRETARY OF AGRICULTURE OF THE UNITED STATES

V. PROGRAM OF THE WASHINGTON CONGRESS

Monday, October 6

- 10 a. m.—Meeting of the Permanent International Commission,
Chamber of Commerce of the United States.
1.45 p. m.—First Plenary Session.....*Constitution Hall.*

Tuesday, October 7

- 9 a. m.—Meetings of the Sections...*Chamber of Commerce of the United States.*
12.30 p. m.—Luncheon of the American Road Builders' Association,
Washington Auditorium.
1.30 p. m.—Opening of the International Exposition and Demonstration of
Road-building Equipment,
Washington Auditorium and Demonstration Field.
Evening.—Continuation of International Exposition.

Wednesday, October 8

- 9 a. m.—Meetings of the Sections...*Chamber of Commerce of the United States.*
1.30 p. m.—Excursion by bus to Mount Vernon and inspection of Mount Vernon
Memorial Highway.....*Departure from Willard Hotel.*
9 p. m.—Reception by the Secretary of State and Mrs. Stimson,
Pan American Union.

Thursday, October 9

- 9 a. m.—Meetings of the Sections...*Chamber of Commerce of the United States.*
2 p. m.—Meetings of the Sections...*Chamber of Commerce of the United States.*
5 p. m.—Reception by the President and Mrs. Hoover.....*The White House.*
8 p. m.—Dinner of the American Organizing Commission....*The Willard Hotel.*

Friday, October 10

- 9 a. m.—Excursion by bus to the Arlington Experiment Station of the United
States Bureau of Public Roads,
Departure from Chamber of Commerce of the United States.
2 p. m.—Plenary session for passing upon conclusions,
Chamber of Commerce of the United States.
8 p. m.—Closing session of the Congress,
Chamber of Commerce of the United States.

Saturday, October 11

- 9 a. m.—Excursion by bus to Annapolis and visit to United States Naval
Academy,
Departure from Chamber of Commerce of the United States.
1.30 p. m.—Reception and luncheon by Hon. Albert Ritchie, Governor of
Maryland.....*Annapolis Roads Club.*



ROY D. CHAPIN

PRESIDENT GENERAL, SIXTH INTERNATIONAL ROAD CONGRESS

PREZ: NT, AMERICAN ORGANIZING COMMISSION

VI. GENERAL BUREAU OF THE CONGRESS

PRESIDENT GENERAL

ROY D. CHAPIN, National Automobile Chamber of Commerce

SECRETARY GENERAL

THOMAS H. MACDONALD, Chief, United States Bureau of Public Roads

VICE PRESIDENTS

- Argentina*.—Valle (J. A.), Civil Engineer, Chief of Section of Highway Research of the National Highway and Bridges Department, Professor of Highway Construction in the University of La Plata, and General Manager of the Highway Section of the Argentine Association of Automotive Importers; Official Delegate of the Argentine Ministry of Public Works.
- Australia*.—Glehrst (Eugens F.), City Engineer, Brisbane.
- Belgium*.—Christophe (Paul), Director General of Roads and Bridges, Brussels.
- Bolivia*.—George de la Barra, First Secretary of the Legation at Washington.
- Brazil*.—Dr. Gurgel do Amaral, Ambassador from Brazil to the United States.
- Bulgaria*.—Putehoff (N.), Director General of Bridges and Roads, Ministry of Public Works, Sofia.
- Canada*.—Pugsley (J. W.), Secretary, Department of Railways and Canals.
- Chile*.—Fernández (Alberto), Engineer, Department of Roads, Santiago.
- China*.—Mun Sun, Minister of Railways, Nanking.
- Colombia*.—Carlos de Narváez, Civil Engineer.
- Costa Rica*.—Arango (Jacinto P.), Commercial and Banking.
- Cuba*.—Corrales (Mamuel A.), Chief Engineer of Roads and Bridges, Director of Work on the Carretera Central.
- Czechoslovakia*.—Hermann (Gustav), Section Chief, Highway Department, Ministry of Public Works, Prague.
- Denmark*.—Ellert (Soren), County Engineer, Helsingør.
- Dominican Republic*.—Franco (Persio C.), Chargé d'Affaires ad Interim of the Dominican Republic.
- Dutch East Indies*.—Ott de Vries (P. J.), Civil Engineer, late head of the Department of Public Works in the Dutch East Indies.
- Ecuador*.—LaFrante (Homero Viteri), Envoy Extraordinary and Minister Plenipotentiary of Ecuador.
- Egypt*.—Aly Ismail Bey, First Secretary of the Embassy of Egypt.
- El Salvador*.—Mejía (Julio E.), Engineer, Dean, Faculty of Engineering, University of El Salvador.
- Finland*.—Skogsström (E. W.), Director General of Bridges and Roads, Ministry of Communications, Helsingfors.
- France*.—Colson (G.), Director of Highways, Ministry of Public Works.
- Germany*.—Dr. Ulrich Stappenhorst, Consulting Director, Ministry of Transport.
- Great Britain*.—Major Cook (Frederick Charles), Deputy Chief Engineer, Roads Department, Ministry of Transport.
- Greece*.—Vrisakis (A. Emile C.), Secretary of Legation at Washington.
- Guatemala*.—Recinos (Adrián), Minister at Washington.

Honduras.—Salazar (Felix Canales). Director General of Roads, Tegucigalpa.
Hungary.—Benke (Stephen), Technical Counsellor in Charge of Road Building Division, Ministry of Commerce.

India.—Mitchell (K. G.). Highway Engineer.

Irish Free State.—Quigley (James). Chief Engineering Inspector, Department of Local Government and Public Health.

Italy.—Senator Luiggi (Luigi). President of Italian Delegation.

Japan.—Fujii (Masuki), Engineer, Department of Home Affairs.

Jugoslavia.—Yossifovitch (Stanislav), Engineer, Director of Public Works of the Kingdom of Jugoslavia.

League of Nations.—Colonel Hiam (T. A.). Assistant to the President Canadian National Railways, Vancouver, British Columbia.

Mexico.—Colin (Alfredo Becerril). Department of Construction and Projects, Comisión Nacional de Caminos.

Netherlands.—Gelinek (W. G. C.). Chief Engineer, Director of the Ministry of Public Works at Haarlem.

Newfoundland.—Hibbs (R.). Chief Commissioner of Highways, Ministry of Public Works.

New Zealand.—Tyndale (Arthur), Highway Engineer, Public Works Department, Wellington.

Nicaragua.—Dr. Morales (Evaristo Carazo), Counsellor of the Legation at Washington.

Norway.—Baalsrud (Andreas). Director of Roads, Oslo.

Panama.—Gnizano (José Ramón), National Roads Board.

Paraguay.—Yusfran (Pablo M.), Chargé d'Affaires of Paraguay.

Persia.—Nourzad (Hasshem Mokassem), Chargé d'Affaires of Persia.

Peru.—Dibos (Eduardo), President Peruvian Touring Club, Association of Importers.

Poland.—Okecki (Mieczyslaw). Counsellor, Ministry of Public Works, Warsaw.

Portugal.—Moreira (Jorge Arsenio d'Oliveira), Highway Maintenance Department; Director, Department of Commerce, Ministry of Communications.

Roumania.—Hniscen (Nicolae), Director General, Roumanian State Highway Institute.

Siam.—Nilakambhaeng (Sangn), Attaché, Siamese Legation.

Spain.—Spiteri (José Rodriguez), President Board of Hard Surfaced Roads, Madrid.

Sweden.—Major Valsinger (Axel), Chief of the Technical Bureau, Royal Board of Roads and Waterways.

Switzerland.—von Steiger (Alexander), Inspector General, Chief of the Division of Public Works of the Federal Department of the Interior.

United States.—Senator Phipps (Lawrence C.), United States Senator from Colorado.

Uruguay.—Copetti (Mario), Public Works Department, Montevideo.

Venezuela.—Suere (Francisco S.), Highway Engineer, Caracas.



Photo by Manuel Freres Paris

M MAHIEU

PRESIDENT OF THE PERMANENT INTERNATIONAL ASSOCIATION OF ROAD CONGRESSES

VII. SECTIONAL COMMITTEES

FIRST SECTION

PRESIDENTS

First Question—SAMUEL ECKELS

Second Question—FRED R. WHITE

Third Question—GROVER C. DILLMAN

SECRETARY OF THE SECTION

ALLEN L. GEMENY

VICE PRESIDENTS

Germany.—Dr. Fuchs (Rudolf), Ministerialdirektor im Badisches Finanzministerium, Karlsruhe.

Vilbig (Joseph), Ministerialrat im Bayerischen Staatsministerium des Innern, München.

Argentina.—Valle (Juan Agustin), Civil Engineer, Chief of Section of Highway Research of the National Highway and Bridges Department, Professor of Highway Construction in the University of La Plata, and General Manager of the Highway Section of the Argentine Association of Automotive Importers; Official Delegate of the Argentine Ministry of Public Works.

Dutch East Indies.—Prof. van Breen (V.), Professor of Civil Engineering, Technical High School, Bandung, Java.

Great Britain.—Major Cook (Frederick Charles), Deputy Chief Engineer, Ministry of Transport.

Italy.—Comun. Ing. Lanzi (Rocco), Superior Inspector of Civil Engineering.

Netherlands.—Van der Wal (J. T.), Chief Engineer, Province of South Holland.

Poland.—Okecki (Mieczyslaw), Counselor, Ministry of Public Works, Warsaw.

Yugoslavia.—Ing. Yassifovitch (Stanislav), Director of Public Works of the Kingdom.

Czechoslovakia.—Ing. Hloasek (Antoine).

France.—Lannay (P.), Directeur au Ministère des Travaux Publics.

Vicaire, Inspecteur Général des Ponts et Chaussées, d'Algérie.

Sweden.—Wretling (E. Paul), President, S. B. Vagforbättringsr.

Switzerland.—von Stelger (Alexander), Inspector General, Chief, Division of Public Works, Federal Department of the Interior.

Wylder (Emil), Chief Engineer, Canton of Argovie, Director of Road Construction at Aarau.

SECRETARIES

Germany.—Dr. Ing. Speck, Sächsisches Finanzministerium, Dresden.

Stuhling (Karl), Banddirektor beim Senate der Freien in Hansestadt, Bremen.

Argentina.—Eng. Balhu (Manuel R.), Official Delegate of the Municipality and City of Buenos Aires and General Director of Street Paving and Street Cleaning Departments of Buenos Aires.

Dutch East Indies.—Vreede (M. H. C.), College of Deputies, Provincial Government of West Java.

Great Britain.—Perrin (E. S.).

Netherlands.—Kerhof (B. J.).

France.—Bouly (M.), Ingénieur en chef, adjoint des Ponts et Chaussées, Département de la Seine.

Brunot (A.), Ingénieur des Ponts et Chaussées (Algérie).

Sweden.—Von Matern (Nils), Chief Engineer, Swedish Institute of Roads.

Yugoslavia.—Pernazic (Nikola), Attaché of the Royal Yugoslav Legation, Washington.

SECOND SECTION

PRESIDENTS

Fourth Question—ALVAN MACAULAY

Fifth Question—A. J. BROUSSEAU

Sixth Question—C. M. BARCOCK

SECRETARY OF THE SECTION

H. H. KILLY

VICE PRESIDENTS

Germany.—Dr. Hellich (Max), Ministerialdirekt im Preussischen Ministerium im Landwirtschaft Domainen und Forsten, Berlin.

Denmark.—Walther, Präsident im Württembergisches Innenministerium, Stuttgart.

Uruguay.—Eng. Girado (Jose I.), Official Delegate of the Ministry of Public Works and of the International Association of Highway Congresses.

Dutch East Indies.—Prof. van Breen (U.), Professor of Civil Engineering, Technical High School, Bandoeng, Java.

Great Britain.—Pool-Godseil (J. S.), Ministry of Transport.

Italy.—Dr. Isacco (Michele Carlo), Consigliere di Stato, Membro del Consiglio Amministrazione dell'Azienda.

Netherlands.—Clerx (J. W.).

Poland.—Walonski (Wladyslaw), Engineer, Technical Department of Warsaw.

Czechoslovakia.—Ing. Revit (Karl).

France.—Lorieux (E.), Inspecteur Général des Ponts et Chaussées.

Comte de Rohan, Président de l'Automobile Club de France.

Sweden.—Major Valsinger (P. A.), Chief of the Technical Bureau, Royal Board of Roads and Waterways.

Switzerland.—Bosiger (Walter), Conseiller, Regierungsrat.

Dubuis (Joseph), Road Construction Engineer, Department of Interior.

SECRETARIES

Germany.—Dr. Nagel (Erwin), Oberbaurat im Braunschweigischen Finanzministerium, Braunschweig.

von Scheuck (Eberhard), Ministerialrat, a. d. Berlin.

Argentina.—Eng. Balim (Manuel R.), Official Delegate of the Municipality and City of Buenos Aires and General Director of Street Paving and Street Cleaning Departments of Buenos Aires.

Dutch East Indies.—Vreede (M. H. C.), College of Deputies, Provincial Government of West Java.

Great Britain.—Hart (E. B.), Ministry of Transport.

Netherlands.—Van Oort (W. K.), Consulting Engineer.

France.—Bedeaux, Ingénieur des Ponts et Chaussées, Senlis.

Truffot (J.), Ingénieur des Ponts et Chaussées, Ingénieur en Chef des Travaux de Paris.

Sweden.—Sodergren (Alex.), Chief Engineer, Secretary of Swedish Road Association.

PLENARY SESSION FOR PASSING UPON CONCLUSIONS

PRESIDENT

EDWARD J. MEUREN



M. EDMOND CHAIX
ACTING PRESIDENT OF THE PERMANENT INTERNATIONAL ASSOCIATION OF ROAD CONGRESSES

VIII. MINUTES OF THE SESSIONS

FIRST PLENARY SESSION

(Opening Session)

HELD AT

CONSTITUTION HALL, WASHINGTON, D. C.

MONDAY, OCTOBER 6, 1930—1.15 P. M.

PROGRAM

Music.—The United States Navy Band Orchestra.

Address.—The Honorable the Secretary of State.

Address.—Mr. ROY D. CHAPIN, President of the Congress.

Address.—Monsieur EDMOND CHAIX, Acting President General of the Permanent International Association of Road Congresses.

Addresses.—The chairmen of the various delegations.

Address.—Monsieur P. LE GAVRIAN, Secretary General of the Permanent International Association of Road Congresses.

Address.—Mr. THOMAS H. MACDONALD, Secretary General of the Congress.

Music.—The United States Navy Band Orchestra.

ADDRESS OF WELCOME OF THE HON. HENRY L. STIMSON, SECRETARY OF STATE

(Speaking in English)

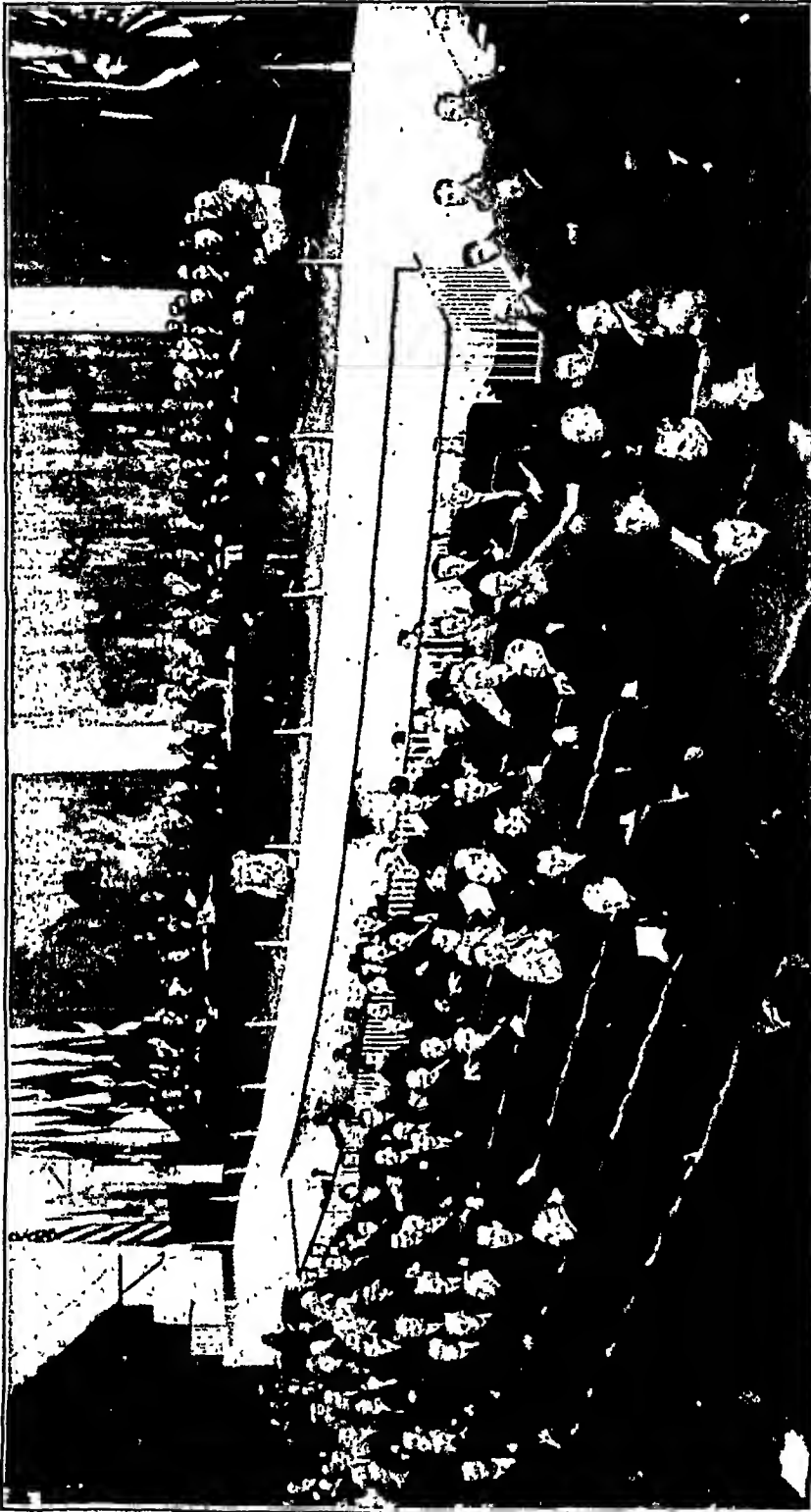
Ladies and gentlemen of the Sixth Congress of the Permanent International Association of Road Congresses, I deem it a very real privilege to extend to you a warm welcome on behalf of the Government of the United States. You have done us the honor to assemble at Washington to discuss a group of problems of vital interest to the progress and prosperity of all of the nations here represented. To many of you attendance at this Congress has meant the sacrifice of time and energy which is very real. We in the United States are deeply grateful to you for the service which you are rendering in bringing to us the results of the best thought and experience of your respective countries in the important problems involved in improved communication through road construction.

As I look over this assembly, I derive much inspiration from the thought that there are here assembled delegates from almost every country in the world, animated by a desire to make the results of their experience available to all.

It is to this unselfish spirit of international cooperation, so finely exemplified in this Congress, that we must look for the basic guarantees of the future peace and prosperity of the world. The outstanding lesson of the present world situation—a lesson which nations are too apt to forget—is that the prosperity of each one is dependent on the prosperity of all, and that in the long run no nation can develop its own national well-being at the expense of its neighbors.

The problems contained in your program, while of vital domestic concern to all the countries here represented, are no less significant in their international aspects. Speaking to this distinguished group of experts, it is unnecessary for me to emphasize the intimate relations between improved road communication and national prosperity, nor need I point out the larger social consequences that flow from the greater accessibility of country to city and of city to country, following as a direct result of improved highways. In our country we have seen the improved road and the motor vehicle reach out into areas as yet untouched by other forms of transportation. We have seen the farmer brought into every-day communication with the city; new breadth given to the life of the urban dweller; commerce quickened; new forces brought to play in the daily battle against disease and against other foes of organized society. Gradually, this medium of road transportation has given flexibility and mobility to our entire transportation systems, bringing all sections into close touch with one another and thus providing a basis for better understanding among our people. Because of these things and because experience has demonstrated that it costs more to go without roads than to have them, our people have taxed themselves in large amounts for highway development and are continuing to do so.

No less important and significant are the international results of closer communication between nations. To cite an instance affecting the United States, I need but refer to the motor tourist travel between this country and Canada, which has contributed so much to closer understanding between the two peoples. We are now looking forward to a time in the very near future when the road communication between the United States and Mexico and with the Central American republics will be so developed as to make possible an ever-increasing interchange of visitors with its attendant strengthening of mutual understanding. These more local examples of better international understanding are consequent upon improved highways,



OFFICIAL OPENING OF THE CONGRESS IN HALL

can no doubt be multiplied a hundredfold by the delegations here present drawing upon the experience of their own countries.

The citizen of one country who travels in another will travel more safely and will be more welcome on the highways if he knows the rules of the road and understands the signs and signals. Tourism will be materially accelerated if the engineers of one country can plan their highway systems so that their roads will connect at the boundaries with those of an adjoining country. The life of the individual will be enriched as he finds it possible to get into his car with his family and drive into other countries to see for himself places and peoples of whom in the past he has only heard or read. All of us will have it in our power to stand like Balboa "Silent upon a peak in Darien," looking out upon new worlds.

From what I have said to you, you will see that I attribute a far-reaching international significance to the deliberations of this Congress. The discussions that will here be held, involving as they do an interchange of the best experience of the world, will redound to the benefit of all the nations here represented. We of America expect to learn much from your experience; we hope that you may find something of value to you in ours.

As you travel around our country after your sessions at Washington, you will find that our interest in your mission and the friendly feeling which we have for you here extends to all parts of the United States. I can assure you that the people of this country will follow your deliberations with deep interest, and on behalf of this Government, I wish you the fullest measure of success in the solution of the important problems which are entrusted to your charge.

When you return to your respective countries, I beg of you to take with you a message of the most cordial good will from the people of the United States. [Applause.]

ADDRESS BY MR. ROY D. CHAPIN, PRESIDENT GENERAL, SIXTH
INTERNATIONAL ROAD CONGRESS

(Speaking in English)

Mr. Secretary, ladies, and gentlemen, on behalf of the American Organizing Commission, it is with the deepest of pleasure I extend to the members of the Sixth International Road Congress a warm welcome to these United States.

This event is significant in that it is the first meeting of this organization ever held in the Western Hemisphere. There are in attendance delegates from more countries than have ever before

convened at any previous Congress, and needless to say, we hope that you will find your time well spent in this country.

Look upon our highways and the traffic over them as a laboratory where you may place everything under the microscope and take away what you find to be good.

We have spent vast sums in highway building during the last 15 years, and our objective constantly has been to secure a dollar's worth of road for every dollar spent.

President Coolidge was the first of our Chief Executives who recognized the need for our affiliation with you, and it was under him that our Congress authorized us to join your association.

Senator Phipps, who sits here upon the platform, was one of the authors of this legislation in Congress.

Later, President Hoover urged upon Congress that our Government invite you to come to this meeting in the United States.

To-day marks the fruition of this friendly invitation and our Government and all of your friends are happy that you have joined with us here in this big gathering.

I only wish that you might have visited us 20 years ago. The improvement in our road condition since then would astonish you.

Of course the motor vehicle imposed upon our highway engineers the duty of providing the type of roadbed that would stand up under this new form of transportation.

Under the leadership of Thomas H. MacDonald and the highway departments of the various States, we believe the problems have been well met, as you will all see before leaving our shores for your homes.

In the early days of road improvement, the highway engineer usually limited his field to road building. To-day, he must be a many-sided man. He must know the engineering methods of construction and maintenance, he must understand as well the economic influences, how the money is to be found to finance the roads, how the money should be spent, and he must administer the highway after construction. In other words, he now has to do with the building, the maintenance and the traffic over the road, and seeks to give his people highway transportation at the lowest possible cost. Few, if any, branches of the engineering profession have advanced so far in 20 years as that which you represent.

In your deliberations you will all be concerned this week with the regulation of highway traffic. Let us see if we can not bring about common rules of the road for all of the world. Let us hope that our findings will help in one of the greatest of humanitarian efforts, the reduction of highway accidents, and the consequent saving of human life.

This is a particularly opportune time that we meet, for every nation is seeking fields for productive labor. What better way is there to add to the wealth and the prosperity of the country, the individual, and the family than by an immediate and widespread increase in road building.

As you motor over our highways you will observe cars with license plates from almost every one of our States. Our system of roads has made touring easy and comfortable. We have broken down any reserve between different sections of the country, our language has become more unified, and the visitor from a distance is no longer the stranger that he was.

You will see our roads used by every shape, kind, and age of vehicle. I believe this new freedom of travel has brought about a more truly United States.

In this conference we may speak a variety of tongues, but we have a great universal language—the language of the road. Our problems are mutual. We are concerned with no special advantages, but with the common good which springs from improved transportation.

Our sole objective is the creation of highways of friendship, within and between all nations. [Applause.]

ADDRESS BY MONSIEUR EDMOND CHAIX, VICE PRESIDENT, ACTING PRESIDENT OF THE PERMANENT INTERNATIONAL ASSOCIATION OF ROAD CONGRESSES

(Speaking in French)

Mr. Secretary, gentlemen, and ladies of the Congress, the great honor of addressing you to-day in the name of the Permanent International Association of Road Congresses devolves on me, owing to the absence of our eminent and respected President, Senator Albert Mahien.

All preparations were made for his departure from Paris, to which he looked forward with great delight in order to take a part, as is his wont, in our deliberations. When, at the last moment he was reluctantly prevented from coming by unavoidable circumstances wholly beyond his control.

He has directed me as vice president of the international association to convey to you his sincere regrets that he finds himself thus deprived of your company, and I am sure that you will heartily join me in expressing to him the disappointment his absence causes us, as well as our sentiments of sincere and heartfelt sympathy.

Ladies and gentlemen, we feel a great and quite legitimate pride in the high patronage extended by President Hoover to the Sixth

International Road Congress. We know he desired to be present and to preside at this opening meeting, but was prevented by very imperative duties from so doing. His benevolence, however, proves to us the great interest he takes in our work. We are all deeply moved and I, in the name of your association, beg to convey to him our profound and respectful appreciation.

To you, Mr. Secretary of State and members of the Cabinet, who so loyally assist the President in all his happy initiatives for the progress and prosperity of this great country. I likewise acknowledge our sincere appreciation, and I shall not exclude from the thanks which comes from our heart, the great organizers of this splendid manifestation, all the members of the Organizing Commission of the Congress, and especially the President, Mr. Roy D. Chapin, and the Secretary General, Mr. Thomas H. MacDonald. They have both been appointed this morning President and Secretary General of the Congress, respectively, and I extend to them our sincere congratulations and express our entire confidence that they will ably direct our meetings and guide our deliberations to successful conclusions.

I shall, of course, associate with them the great American associations and corporations that have so nobly and efficiently cooperated with the American Organizing Commission and seconded its action. For 22 years up to the present time, ladies and gentlemen, the International Association of Road Congresses has held its congresses in European cities: Paris, Brussels, London, Seville, and Milan in turn have each welcomed us; and to-day in this year 1930, having left the soil of old Europe and having crossed the high seas, we are centering our work in Washington, the Capital of these United States of America.

What a sign of the times! What a transformation in the history of the world! Continents which once seemed so far apart are now almost neighbors. Speed, conquered at the cost of superhuman efforts, has abolished distance, or at least tends each day to curtail it more and more and to draw nations nearer to each other. We, builders of modern highways, are among the principal factors of this speed, which is a source of economic wealth by facilitating and hastening transportation, by saving time, or rather by employing it to better advantage.

It is therefore but natural and just that, in comparing our progress with that of former periods, including that exemplified by those wonderful Roman roads which we admired so much in Italy four years ago, we should have come here to see, study, and admire the splendid achievements of the younger world as exemplified by the modern system of highways of the United States of America.

To you all who are giving us such a fine welcome, and to you in particular, Mr. President, we say thank you, from the bottom of our hearts. We are going to get to work quickly and actively. To you, ladies and gentlemen, who from every corner of the world have so handsomely and in such great numbers responded to the invitation of the United States Government and to the appeal of our association, to the reporters, general reporters, and delegates, you will please allow us to express to you all our appreciation.

We take real pride in uniting, by your initiative, in a fruitful task so many good wills, so many competent authorities, and thus contributing usefully to the progress of humanity. [Applause.]

ADDRESS BY SR. GURGEL DO AMARAL, AMBASSADOR FROM BRAZIL.

(Speaking in English)

Mr. Chairman, honorable colleagues, ladies, and gentlemen, it is not in my official capacity as representative of my country that I have the honor to address the Congress at the present moment. It is as one of the delegates from Brazil that I am permitted to join with you in the spirit of good will and the common love of our country. There was quite an honor conferred upon me at the very moment I entered this hall. I was most kindly requested by my honorable colleagues and fellow Spanish Americans to voice their own feelings and to express their own thoughts in close union with the ideals of Brazil, of which country I am now the representative.

This was in due token of the very eloquent statement and testimony of the friendship that exists in all countries of America, which has shown that we are a closely united family, notwithstanding the difference of language (which is very slight) between the Spanish-American countries and the Lusitanian-American country which I have the honor to represent—Brazil.

It gives me a great sense of gratitude for the distinction conferred upon me to speak in the name of Mexico, of Venezuela, of Guatemala, of Honduras, of Nicaragua, of Costa Rica, of Panama, of the Dominican Republic, of the Republic of Cuba, of Colombia, of Ecuador, of Peru, of Bolivia, of Chile, of Argentina, of Uruguay, of Paraguay.

Were it not for the fact that at the present moment my diplomatic character rather requires from me a concentration of attention upon a little political difficulty in my own country, I would have prepared a short address in an endeavor to tell this country of our achievements in Brazil on the most important problem of highway construction. I realize thoroughly how private conferences with every one of my distinguished colleagues from Spanish America would bring

forth a display of their own achievements and programs, but time and space under the circumstances do not permit of this.

I beg of you to be patient enough to take these achievements into consideration in your deliberations in the Congress. I hope that you will recognize that our nations are doing everything in their power to justify their own high expectations of the development of civilization in the New World.

I may add that as representative of my honorable colleagues of Spanish America, I tender to all the other countries our most heartfelt good wishes and assure them of the good fellowship of every one. [Applause.]

ADDRESS BY MONSIEUR PAUL CHRISTOPHE (BELGIUM)

(Speaking in French)

Mr. President, ladies, and gentlemen, in the name of the Belgian members of the Congress and more especially of the Belgian Government which has sent me here, I present my respects to the President of the Republic of the United States of America.

It is with a sentiment of profound gratitude that I recall the rôle played by Mr. Hoover, in tragic circumstances, as the head of the Commission for Relief in Belgium, which saved our population from famine and misery, and the final act by which he placed the balance of this charitable fund at the disposition of the Belgian Government to found scholarships in certain schools and thus assist students with small resources.

This rôle of material assistance and of instruction is again being filled to-day by the United States in summoning us to take part in the Sixth International Road Congress.

Belgium, as the crossroads of Europe, recognizes the duties which she has to perform to facilitate transportation. During the first years following the war, a rapid increase in automobile traffic aggravated to an almost catastrophic degree the already unsatisfactory condition of our road system. Belgium, handicapped by its fiscal difficulties, was powerless to remedy this situation at that time. Happily, however, the revalorization of the Belgian franc has permitted us to undertake the necessary improvement. For the last three years we have concentrated all our efforts upon this task. Soon we shall have strengthened, widened, and improved our principal highways. But the task is still far from being finished. The intricate system which constitutes the roads of a country of congested population demands long and continuous efforts.

You are here, gentlemen, to show us the example of a strong people which knows what it wants, establishes its ways and means,

and develops and perfects its processes. I thank in advance the American members of the Congress for the examples which they are going to show to us, and I express most sincere good wishes for the success of their efforts. [Applause.]

ADDRESS BY MONSIEUR GUSTAV HERMANN (CZECHOSLOVAKIA)

(Speaking in French and English)

Mr. President, ladies, and gentlemen, in the name of the Government of the Czechoslovakian Republic, I have the honor to express my respectful homage to the Government of the United States, which has paid us the honor of inviting us to the Congress assembled in this celebrated city, and I salute the President and the commission in charge of the Congress and all the illustrious delegates of the nations here represented.

Just three years ago the Czechoslovakian Government created a highway fund and commenced the modernization of our road system. We are persuaded that in profiting by the experience of the eminent engineers who are united in this assemblage, we shall find great assistance in our work. We most sincerely hope for the great success of this Congress, the purpose of which is to further road development for the greater benefit of human civilization.

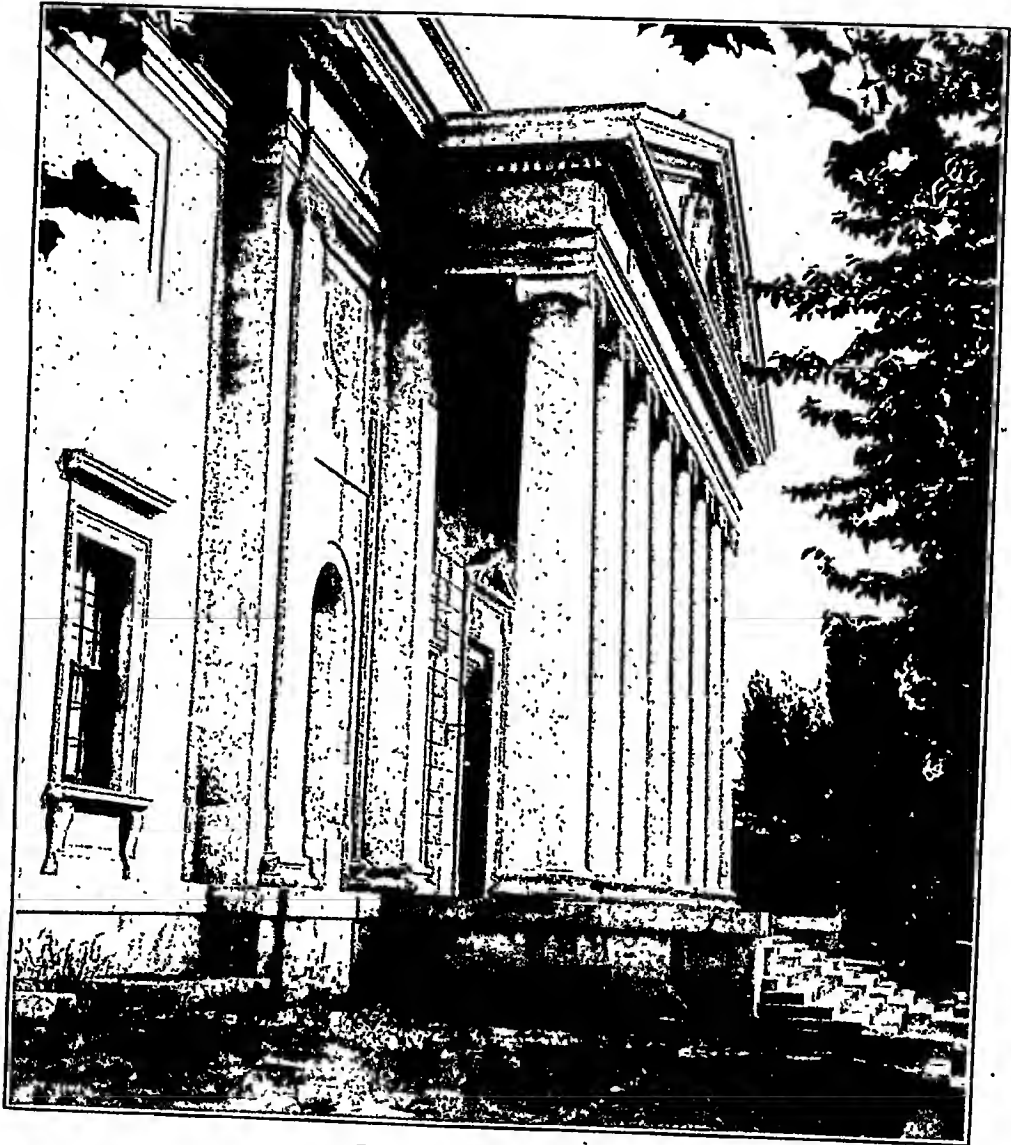
Czechoslovak engineers admire the spirit and genius of American engineers and wish them increased success. Thank you. [Applause.]

ADDRESS BY MONSIEUR G. COLSON (FRANCE)

(Speaking in French)

Ladies and gentlemen, I have been honored by the Minister of Public Works of France in being placed at the head of the French delegation. It gives me great pleasure to speak in his name and to address my thanks to all the organizers of this Congress. I wish to thank the American Government for the perfect reception which has been given us, and also for all those courtesies and facilities which indicated to us, even upon our departure from France, how we would be received in America. We have come here with the will and the desire to participate in a common task, but from the very first we have received so perfect an impression of friendly sympathy that our labors can not help but be greatly facilitated.

We thank the Permanent International Association for having chosen the United States for the Sixth International Congress. The prodigious development of the automobile in the United States of



CONSTITUTION HALL
WHERE THE FIRST PLENARY SESSION WAS HELD

America has posed new problems, the solution of which has been undertaken with a remarkable breadth of conception. The French Government attaches extreme importance to this Congress, which will permit us to study and to develop problems with which we are likewise confronted. France is represented here by 60 congressists, including 33 official delegates. It is in their name that I speak, in the name of the Minister of Public Works, of the Minister of the Interior, of the Minister of Air, of the Minister of the Colonies, of the Governments of Morocco, of Tunis, and of Syria.

We have among the official delegates le Vicomte de Rohan, president of the Automobile Club of France, which is the oldest automobile club in the world. This club and the International Federation of Recognized Automobile Clubs, of which M. de Rohan is also the delegate, have understood the necessity of close relationship between highway engineers, automobile constructors, and those who use the roads, the motorists. The fact that the Vicomte de Rohan has been chosen as a delegate is particularly pleasing to us, because he is one of the descendants of LaFayette, whose name recalls so many memories common to the history of both our countries.

Thus the French delegation, setting out for America with the desire to work, has arrived in America with a profound emotion which I need not dissimulate. We rejoice for all that we shall see and for all that we shall learn in this contact with the great people of the United States. [Applause.]

ADDRESS BY HERR ULRICH STAPENHORST (GERMANY)

(Speaking in English)

Mr. President, ladies, and gentlemen, in the name of the Government of the German Republic and of the German delegation, I have the honor to transmit our country's sincere respects and thanks to the Government of the United States of America for their invitation to the Congress beginning to-day; thanks also to the President for his friendly address of welcome. I assure you that we have accepted your invitation with much pleasure in order to cooperate with the Congress. We are convinced that we shall gain from the discussions and events many comprehensive suggestions, more so as the Congress of this year will be held in a country favored with rich financial and technical resources, which has developed road building in a manner worthy of imitation.

Beyond its practical tasks, I see in the Congress also a political event. Generally, it will strengthen the efforts now being put forth to bring together the various nations and will further the ideal of mutual understanding.

In this connection, and in the name of the German Government, I have the honor to renew our invitation expressed at the Congress in London in 1913, to hold the next Congress in Germany in 1934 at Munich. We will do our best to prepare a worthy reception for the Congress and make the stay of the delegates in Germany as useful and as agreeable as possible. [Applause.]

ADDRESS BY MAJ. FREDERICK C. COOK (GREAT BRITAIN)

(Speaking in English)

Mr. Chairman, ladies, and gentlemen, on behalf of the British delegation, and may I associate with Great Britain the representatives of the British Dominions Beyond the Seas who are attending this Congress in greater numbers than on any previous occasion. I beg you to accept our hearty thanks for your kindly welcome.

Most of us are paying our first visit to the United States, and we could have no better index of the variety of the problems with which you are called upon to deal than that within a few hours we should have passed from the stress and turmoil of New York through a peaceful country, striking in its spaciousness, to the charm and dignity of this beautiful city of Washington.

But though this is to most of us an unknown country, we have no feeling that we are among strangers. We may not be in complete agreement with you upon the subjects we have met to discuss, but we are happy in the knowledge that our differences, if any, will be expressed in the same language which is our common heritage.

Hitherto the meetings of this Congress have been held in the Old World, but now we have come to the New, and we regard the invitation to hold this meeting in the United States as an indication of the importance which the Government attaches to the international character of the road, rather than the point of view of the road maker or the road user.

In their broader aspects, road problems are the same all the world over, but they differ in detail as in degree, and your task in America exceeds in magnitude, though perhaps not in intensity, any with which countries on our side of the ocean have been called upon to deal.

We have followed with close attention, though from a long distance, the manner in which you have dealt with those problems. Your Bureau of Public Roads has been of special interest to us by reason of the ~~very~~ valuable experimental work which has been carried on and the information which has been so readily placed at the disposal of other nations, and we are especially gratified that we are to have the opportunity of observing the practical results which have been achieved in the various States of the Union.

May I add an expression of our thanks for the very thorough arrangements which have been made for the success of this Congress and the well-being of the delegates. I can promise that we will show our gratitude in the manner you would most have us do; that is, by our hearty cooperation in your efforts. [Applause.]

ADDRESS BY MR. JAMES QUIGLEY (IRISH FREE STATE))

(Speaking in English)

Ladies and gentlemen, on behalf of the Irish Free State and on behalf of the Irish people, and on behalf of the greater Ireland in the United States of America, I merely wish to offer a word of congratulation to the American people on the organization of this Sixth International Road Congress.

I have already attended three or four congresses, and undoubtedly it was up to the American organizers, Mr. MacDonald, Mr. Chapin, and their confreres to do something worthy of the greatest nation in the world, and I think they have not failed in the task.

Although mindful of the social entertainment of these Congresses, which I thoroughly enjoy, I think that is not the spirit of the American people behind this Congress. We have had already on the Steamship *George Washington* something of the spirit in which the American people through their representatives have approached their task. On the *George Washington* we were entertained and instructed every day by a representative of the American engineers, Mr. T. W. Allen. He took us to school, so to speak, for an hour or two every day, and undoubtedly, speaking for myself and I am sure for every engineer aboard the *George Washington*, we appreciated his lessons.

Gentlemen, I thank you. [Applause.]

ADDRESS BY SENOR LUIGI LUIGGI (ITALY)

(Speaking in English)

Mr. Chairman, ladies, gentlemen, the Italian Government, and the esteemed members of the Federation of Italy have intrusted to me the pleasant duty of bringing to you their most sincere and hearty good wishes for the success of this Sixth International Road Congress.

Having had the honor of being President of the Fifth International Road Congress in Milan, Italy, allow me to add my own personal and great admiration, together with the admiration of the

Italian delegation, for the immense progress you have made in America since the Fifth International Road Congress. You have really constructed so much and such immense highways, that I think every nation comes to America to learn all about road building and road improvement. And no wonder, because the great founder of this American Republic, George Washington, was an engineer and a statesman, and he set the first policy that has resulted in what you now have, and it was due to this great founder that the present independence and prosperity of America and this wonderful system of highways now exist.

Your perfect roadway system and complete railways and other means of transportation are a result of the development of your tremendous national interest.

Over in Italy we have some fine roads. We have some of them that are considered the cream of roads and others, which, unfortunately, are narrow and not up to date. That is why we came to America, to learn from you the best methods of improving our roads without spoiling their natural artistic beauty, to make them better for transportation by mechanical means.

I believe since the last Congress we have applied many of the things we have learned here in the Congress and here in America, and if you will do us the honor to come to Italy to visit and find out what we have done, you will find some 2,000 miles of highways already under way according to modern ideas and we have under construction some other thousand miles, which will, we hope, in the next two or three years compare with American roads.

Mr. Chairman, ladies, and gentlemen, with these sentiments, I have the honor to renew the hope of the Italian Government and of all the Italian people, who, under the splendid leadership of our great leader, Benito Mussolini, are working with all their energy to make Italy a grand nation, that they will have the cooperation of the other countries of the world in which this great American Nation is the most important factor. [Applause.]

ADDRESS BY SHINTO FUJII (JAPAN)

(Speaking in English)

Mr. Chairman and delegates of the Congress, I have the honor to express my appreciation and pleasure on behalf of my Government of Japan. We are happy in having an opportunity to come to the United States where highway engineering has advanced to the highest point, in order to learn something of the methods employed. It is with a feeling of pleasure and obligation combined that we come to learn. [Applause.]

ADDRESS BY MR. W. G. C. GELINCK (HOLLAND)

(Speaking in French and English)

Mr. President, ladies, and gentlemen, at the opening of this Sixth Congress, I desire to express the appreciation of the Royal Government of the Netherlands for your invitation to be represented here by official delegates. Holland has accepted this invitation with pleasure and the Dutch congressists have come to this splendid city to collaborate closely with you in the common purposes of the association.

We, in Europe, know how the Americans fear any waste of time, so I will be brief with what I wish still to add.

The members from Holland have come with the same fellow feeling that the Dutch people have for their American brethren, a feeling which dates from the early days of the landing of the first white men in America.

We know what excellent road makers you are. The early Americans, axe in hand, made their footpaths to the Middle West, and along these simple roads civilization was brought westward.

I can not mention here the names of all your road makers. Let me make an exception for one example, the expedition of Lewis and Clarke.

It is just 125 years ago this month that this expedition, sent out by President Jefferson, 15 months after leaving St. Louis, reached the great ocean, having followed the Missouri trail with enormous and endless difficulties. Lewis and Clarke reached Portland in October, 1805. This was road making in the first and most difficult stage. The beautiful monument yonder, of the little Indian squaw Sacnjawea, the faithful helper of the two engineer explorers, may be taken as a monument for the American road builders to whom I bring here a Dutch salute of honor. [Applause.]

ADDRESS BY MR. ANDREAS BAALSRUD (NORWAY)

(Speaking in English)

Mr. President, ladies, and gentlemen, as the representative of the Government of Norway I have the honor to express my thanks for the invitation to this Congress. And I should like to express our feeling for the engineers of this country, the United States of America, and to say that we appreciate very much the good work of the American highway engineers. We desire to express our appreciation for the work of Mr. MacDonald, who has done so much for the work of this country in highways, and thereby also for my country of Norway. [Applause.]

ADDRESS BY MONSIEUR MIECZYSLAW OKECKI (POLAND)

(Speaking in English)

Mr. Chairman, ladies, and gentlemen, on behalf of the Polish Government I have the honor to express to you our sincere interest in the success of this Congress which has to do with one of the most important problems of all the nations to-day. I am in the happy position now to express to you greetings in the name of about 160 Polish members of our association, of which only a few have been able to come over to this splendid Nation, but we desire to say for our entire Polish membership that they feel sure that our united work will make us a united nation. I thank you gentlemen. [Applause.]

ADDRESS BY SR. JORGE ARSENIO D'OLIVEIRA MOREIRA
(PORTUGAL)

(Speaking in French)

Mr. President, ladies, and gentlemen, in the name of Portugal I have the honor of thanking the Government of the United States for having invited my country to be represented at the Sixth International Road Congress. Let me salute, at the outset, all the nations assembled in this Congress, at the same time addressing my warmest salutations to the United States, the great Nation which has received us with so many marks of friendship and distinction.

Permit me to speak a little of my own country, the country of the sun and of the perfumed orange trees, where there has been born such a host of heroes, of poets, of navigators, and of saints. This country, Portugal, emerged from the Great War economically impoverished. A rapid depreciation of its currency subjected it to enormous difficulties, the effect of which our roads were not the last to feel. The increasing development of automobile transport almost completely ruined them. But at present, thanks to tireless efforts, we have remade some excellent roads in Portugal. During the last four years our small resources not permitting us to remake the roads all at once, we have had in progress a remarkable program of intensive repairs. Of a system of 15,000 kilometers, 3,500 are completely repaired, of which 500, connecting the principal centers of population, are hard surfaced.

We, Portuguese engineers, our opportunities for experiment being very much reduced, would hardly be able to bring much advice to this Congress, in which are represented the chief road builders of the world. We will follow attentively the lessons of our confères, and upon our return to Portugal we shall have learned much. The results of this Congress will be impressive, I am sure. The Perma-

nent International Association of Road Congresses will have once again rendered new contributions to civilization and to the well-being of humanity.

Please receive, gentlemen, the homage and the salutations of the Government which I represent. [Applause.]

ADDRESS BY SR. JOSE RODRIGUEZ SPITERI (SPAIN)

(Speaking in Spanish)

Mr. President, ladies, and gentlemen, the delegation from Spain to the Sixth Road Congress which we inaugurate here to-day has the high honor of paying its respects to the honorable President of the Congress, to the Executive Committee and to all its members, and to the worthy and valued leaders of the International Road Congress. Messieurs Mahien and Le Gavrian, all of us regretting the absence of the former. I wish also, in the name of my colleagues and in the name of my country, to give sincere thanks that the Spanish language has been accepted as one of the official languages of this Congress. It is very fitting that the language spoken by 20 nations and more than 100,000,000 inhabitants of this continent discovered by the Spaniards should serve to express the ideas and sentiments of their sons and the sons of the Latin American Republics, to whom, on this solemn occasion, I bring and extend the strongest and most sincere greetings from old Spain.

We, the Spanish engineers, come with great eagerness, with an extraordinary interest in the work of this Congress. Many projects are here presented, which eminent engineers have outlined in their deliberations and in their work, and we keenly desire to learn and acquire the knowledge which they have accumulated in order to apply it in our country. At the same time we have an active desire to see this country, to know its works and its accomplishments; this great country, which by its energy and by its efficiency, by the strength of its sons and by their constant efforts, has placed itself at the head of the civilized peoples of the world.

All Spaniards also have, and the congressional delegates should have, a lively interest in the extraordinary progress of our association.

The improvements which have been accomplished in the highways, which are and which always will be the bonds of union between the old and the new in order that people may be acquainted with one another, the relations and ideas which here make mutual contact, must undoubtedly determine the beautiful motto of our institution. "Via Vita" may be completed by no less a suggestion than "Victoria Pax." [Applause.]

ADDRESS BY MAJ. AXEL VALSINGER (SWEDEN)

(Speaking in English and French)

Mr. President, ladies, and gentlemen, the minister of the United States of America in Stockholm, having on behalf of his Government invited His Swedish Majesty's Government to be represented at the Sixth International Road Congress in Washington, the Swedish Government has appointed me to take part in this Congress as the official delegate of Sweden.

It is in that capacity, as well as a life member of the Permanent International Association of Road Congresses, that I now have the honor of addressing this distinguished assembly.

For myself as well as the other Swedish members of the Congress, I wish to express our most respectful homage to the President of the United States of America. To the Secretary of State, and to the members of the American Government forming the honorary committee of the Congress, I also tender our warm thanks for the invitation to participate in this Congress.

Our thanks also are due to the American Organizing Commission, and especially to Mr. Roy D. Chapin, President of the Commission, and to Mr. Thomas H. MacDonald, its Secretary General, for the brilliant and successful manner in which this Congress and its labors have been organized. We, Swedish delegates, still hold in grateful memory the visit to our country in 1926 of Mr. MacDonald at the head of a delegation of American road officials and engineers after the close of the Fifth International Road Congress in Milan.

Please permit me now to say a few words in the French language. I address myself first to Monsieur Mahieu, the President, and to Monsieur Chaix, who represents him here as Vice President of the International Association of Road Congresses.

In the name of the Swedish members of the Congress, I have the honor of presenting to President Mahieu, whose absence is greatly regretted, and to you, Mr. Vice President, our respectful homage and our most grateful thanks for the masterly way you have conducted our association and successfully directed our work.

Next I address myself to Monsieur Le Gavrian, our excellent and distinguished Secretary General. There devolves upon him a heavy labor, particularly when an international congress is in preparation and in session. In the name of the Swedish delegation, I pray you to accept, Monsieur Le Gavrian, our warmest thanks for the brilliant manner in which you have accomplished your heavy task. [Applause.]

The labor now being expended on the extension and improvement of the Swedish road system constitutes, at the present moment, one of our most urgent national tasks; one which is of the utmost im-

portance for the future development of our country. In Sweden, as elsewhere, the rapid progress of motor traffic has necessitated a thorough rearrangement of transport methods. This is best illustrated by the fact that while only 10 years ago we had in Sweden 1 automobile for every 687 inhabitants, there is at present 1 motor car for every 46 persons. Of course, this does not compare with the United States with 1 automobile for every 5 persons and still less with the State of California with 1 motor car for every third person. This last figure means that the entire population or all the citizens of that State could quite conveniently undertake a modern exodus in their own motor cars. Nevertheless, the statistics for Sweden display a motorization of our country that a very few years ago would have been considered almost impossible.

This tremendous increase in automobile traffic has brought the roads, and especially the country highways, into prominence as mediums of communication and transport. Figuratively speaking, roads are the arteries of a nation, and without exaggeration it may be said that a good system of roads constitutes one of the greatest assets of a country and one of the principal conditions for the prosperity and well-being of any land.

The Sixth International Road Congress, the first outside of Europe, is now about to begin its labors. Like its predecessors in Paris, Brussels, London, Seville, and Milan, the aim of this Congress is to promote progress in the construction, maintenance, traffic, and exploitation of the roads. The Swedish members of this Congress are most happy to collaborate in these efforts.

With these words I have the honor to greet the Sixth International Road Congress in Washington on behalf of the Swedish delegation, and I address special greetings, combined with our warmest thanks, to our American colleagues who have spared no effort to make this reception the wonderful success that it is.

I am convinced that the labors of the Sixth International Road Congress in Washington also will be crowned with a great success, and I entertain the firm conviction that the results of this Congress will carry us onward to the great goal that the Permanent International Association of Road Congresses has in view; a goal that is common to all countries and to all nations—the progress of culture and the progress of civilization. [Applause.]

HERR ALEXANDER VON STEIGER (SWITZERLAND)

(Speaking in German)

Honored President, ladies, and gentlemen, I bring to the great sister Republic the greetings of the Swiss Confederation. I have come to study with you how to build firm roads—lines of communication from land to land and heart to heart. [Applause.]

The PRESIDENT (Mr. Roy D. Chapin). It is with especial pleasure that I introduce the next speaker. Ever since the inception of this organization he has been officially connected with it and Secretary General of it for the last 10 years. He is modest and retiring, and as such men usually are, he is most effective. He has done a great work for this organization; and it is a pleasure to introduce to you the Secretary General of the Permanent International Association of Road Congresses, Monsieur Paul Le Gavrian. [Applause.]

ADDRESS BY MONSIEUR P. LE GAVRIAN, SECRETARY GENERAL
OF THE PERMANENT INTERNATIONAL ASSOCIATION OF ROAD
CONGRESSES

(Speaking in French)

Ladies and gentlemen, all of you who came with eagerness to Washington, crossing oceans and great countries to attend this Sixth International Road Congress, are aware of the splendid welcome extended to us by the Government of the United States and by the American Organizing Commission.

You are here, one might say, as victors. But you know that the ancient tradition required that near each victor's chariot there should be a flute player to remind the man fêted, that he was, in spite of all, a mere mortal, subject to the hard obligations of the ordinary human condition. That ungrateful but necessary rôle of flute player is the one that has fallen to your Secretary General, my friend Mr. MacDonald, and myself. That is why we must stand before you, after the masterly addresses to which you have listened, not, it is true, to play the flute (for which our excellent orchestra conductor would not forgive us) but to remind you of the necessities of the congressman's life that you are to live during the remainder of this week.

You came to Washington to work and, starting to-morrow morning at 9 o'clock, the technical program of your studies will be followed in accordance with the schedule arranged by the Organizing Commission.

We are assured that you will all come and take part in the sessions and deliberations of the sections, and that you will not yield—beyond reasonable limits—to the temptation of playing truant, a fault which, however, would have the benefit of extenuating circumstances in this magnificent city whose beautiful avenues, parks, and monuments offer the temptation of strolling under the element sky of Indian summer with which our meeting is favored.

But have no fear! Your virtue will not be tested beyond endurance, for the experienced and indulgent wisdom of the Organizing Commission took care to mix with the work of your program a number of choice diversions. So, ladies and gentlemen, we will start

work briskly, and we shall get all the benefit from this Congress that it is important to get out of it, both for the improvement of our individual knowledge and for the advancement of the vast national and international interests which, in the road domain, are intrusted to your competency and your activity. [Applause.]

The PRESIDENT. The next speaker is also a very modest gentleman. I have known him for many years. He has for a long period been connected with our United States system of highways. During this session this afternoon, delegates from the various countries have been so kind as to give praise to your chairman for the arrangements which have been made in connection with this Congress. Actually, the credit goes where it belongs, because it belongs to men like Johnson, Fairbank, James, officials of the Government, and many others who have worked hard in connection with this Congress, and a big part of it, above all, goes to your next speaker, the Secretary General of the Congress, Thomas H. MacDonald. [Applause.]

ADDRESS BY MR. THOMAS H. MACDONALD, SECRETARY GENERAL
OF THE SIXTH INTERNATIONAL ROAD CONGRESS

(Speaking in English)

Mr. Chairman, ladies, and gentlemen, the Sixth International Road Congress has now become an actuality, possessed of spirit, character, and splendid potentialities for contributing to the advancement of the major human causes which, without exception, are largely dependent upon easily available and economical transportation.

This inaugural, with its promise of worthwhile accomplishment, is only possible because of the heritage of sincere purpose, of national hospitality, of personal friendship, of guidance by the officers of the Permanent International Association of Road Congresses, of government participation and international cooperation extended by individuals and groups widely representative of the nations of the world, all of which have been in generous measure wrought into the structure of the five preceding congresses. Each one of these congresses, with its individuality and its advance, was necessary to make this day and this occasion; each one has made its contribution.

What greater stimulus to constructive thought and creative effort could be afforded the road technician, the highway official, or the transportation student than the opportunity extended by Italy in the preceding assemblage of this body, the Fifth International Road Congress of 1926, held in Milan and Rome, where the romance, the science, the art, the passing centuries, the human pageant since Christ, all presented the varying picture of civilization, as influenced by highway transport, to our imagination while we were permitted



THOMAS H. MACDONALD
SECRETARY GENERAL, SIXTH INTERNATIONAL ROAD CONGRESS
SECRETARY GENERAL, AMERICAN ORGANIZING COMMISSION

to know the splendid and most modern autostrada from Milan to the lakes of Lombardy and in contrast the Via Appia Antiqua leading out of Rome—the City Eternal?

We of the United States can not hope to offer you 2,000 years and more of transportation history. Yet we do not apologize; in fact, we have perhaps a grievance ourselves. If the vikings from the northland, represented in descendants here to-day, had not been such transient visitors to North America, or if the ancestors of the delegates from Spain represented here to-day had earlier contributed their earrings to start Columbus westward a thousand or two years before he actually did come, by this time we hope we might have more nearly approached a solution of our road problem, or more properly our many road problems. These we hope to attack now with renewed effort and enthusiasm in conference and cooperation with you, beginning with the section meetings which open to-morrow morning at 9 o'clock. I repeat, at 9 o'clock.

The program is a full one. It will require much devotion and no little determination to give full consideration to the important questions. It is our hope to expedite the conference proceedings by carrying on the work simultaneously in the four official languages, and we seek in advance your cooperation and perhaps your patience until the system is working smoothly. We do not want another "tower of Babel." Your presence at the time for opening each session will be most helpful.

This little word of friendly exhortation to remind us all of the serious purposes of the Congress, and to record the need for an accelerated pace in advancing the science of highway improvement and administration, falls officially to the lot of my efficient colleague, Monsieur Le Gavriin, Secretary General of the International Association of Road Congresses, and to myself as Secretary General of this Congress.

With this duty disposed of, and having thus placed the outcome on the "knees of the gods," I turn for the closing word to the wonderfully pleasant privilege of greeting you, delegates and guests from all the other countries, in the name and in the spirit of those whose thought and efforts are dedicated to the improvement of the public highways of this country. Since this is the first time the Congress has come to this western continent, I broaden this to extend a most cordial greeting and welcome to those from the older continents in the name of the highway fraternity of all the Americas, South, Central, and North. We are happy and honored to have you here—west of the Atlantic and east of the Pacific Oceans. Thank you [Applause.]

The PRESIDENT. Gentlemen, I wish to congratulate the Congress on this meeting. This meeting stands adjourned. [Applause.]



M. PAUL LE GAVRIAN

SECRETARY GENERAL, PERMANENT INTERNATIONAL ASSOCIATION OF ROAD CONGRESSES

SECTION 1.—SESSION OF TUESDAY FORENOON, AT 9 A. M.,
OCTOBER 7, 1930

FIRST QUESTION.—RESULTS OBTAINED BY THE USE OF (A) CEMENT; (B) BRICK
OR OTHER ARTIFICIAL PAVING

SAMUEL ECKELS, Chairman.

ALBIN L. GEMENY, Secretary.

The CHAIRMAN. Gentlemen, we will proceed under the First Section, Construction and Maintenance.

First Question: Results obtained by the use of—(A) Cement.

General Reporter, Mr. Frank T. Sheets, Chief Engineer, Illinois Department of Highways, Springfield, Ill.

The GENERAL REPORTER (Mr. Sheets). Mr. Chairman and gentlemen, in preparing the report on this question, Results Obtained by the Use of Cement, the Reporter has reviewed carefully each of the papers submitted by the reporters of the several countries. An effort has been made to set forth in the general report, as near as it may be determined, the concensus of opinion of all those who have written about this subject. This report is divided into two parts. The early part of the report discusses briefly the general information upon which the second part or conclusions is based.

In view of the fact that the delegates have had this report before them in printed form, I shall not take the time to present in detail the early part of the report, but will state at this time merely the second part, or statement of conclusions.

1. Cement is becoming generally used as a paving material and has many inherent advantages.

2. It has been used successfully in the construction of cement concrete base courses for other surfaces; for cement concrete pavements, and for cement-bound macadam.

3. Cement concrete pavements and base courses are suited to heavy traffic.

4. Where a large volume of steel-tired traffic is encountered, 2-course concrete pavements, with the upper layer composed of very hard aggregates, have been necessary and successful. Other surfaces on concrete base courses have also satisfactorily met this condition.

5. Single-course pavements have successfully carried maximum volumes of traffic and maximum wheel loads when the traffic was largely rubber tired.

6. Cement-bound macadam has been successful on roads carrying light traffic not inimical to the macadam type of construction.

7. Cement concrete pavements, when compared with cement concrete base courses surfaced with other materials, give equal load-carrying capacity or structural strength at less cost.

8. Competent engineering supervision of design, construction, and maintenance of cement concrete pavements is necessary to insure good results.

9. Subgrades must be uniform and stable.

10. Pavement slabs must be designed to carry expected loads. Edge thickening is necessary.

11. Longitudinal and transverse joints are commonly used and must be designed to meet traffic, subgrade, and climatic conditions.

12. Scientific design of concrete mixes and weight proportioning of aggregates represent the most modern practice.

13. Construction operations are performed mostly by machinery, with resulting lower cost and better workmanship.

14. Thorough curing of concrete surfaces is essential.

15. Maintenance of concrete surfaces, properly constructed, is relatively simple and reasonable in cost.

That concludes the statement of the conclusions.

The Reporter has received suggestions for certain modifications of these conclusions from the members of the English and French delegations. An examination of these suggestions indicates that there is disagreement on the part of those delegations only in certain minor statements embodied in the conclusions; and the Reporter is of the opinion that there should be no difficulty in harmonizing the points of view of at least the General Reporter and these delegations.

For the convenience of the Chairman of the Section, certain possible revisions in the conclusions have been prepared by the Reporter to meet some of the suggestions made, which are available if called for.

At this time the General Reporter wishes to apologize to the members of the English and French delegations who have sought to communicate with him here in Washington for not having had opportunity to meet them for the discussion of this matter in advance of the session.

The CHAIRMAN. Gentlemen, you have heard the report as read by Mr. Sheets. What is your pleasure?

Lieut. Col. J. E. BLACKWELL (England). Mr. Chairman, I have an amendment to suggest on a number of grounds.

No. 1. The wording as read by the Reporter is agreed to by the English delegates, but they suggest the addition of the following words: "Rapid-hardening cement has special advantages in particular circumstances."

No. 3. The English delegates consider this is worded in too comprehensive a manner and suggest that it should read as follows:

Cement concrete base courses are suited to all heavy traffic.

In explanation of that proposed amendment, the original conclusion suggests that cement concrete bases and wearing surfaces are the best form for carrying the most exacting forms of traffic. In the English opinion, this refers to base courses but should not include wearing surfaces of concrete to the exclusion of other forms of wearing surface.

No. 4. The English delegates suggest that this should read as follows:

Where a large volume of traffic not containing a high proportion of heavy steel-tired traffic is encountered, 2-course concrete pavements, with the upper layer composed of very hard aggregates, have been successful. Other surfaces on concrete-base courses have also met this condition satisfactorily.

In explanation of that amendment, the experience of the English delegates has met with cases where very heavy steel-tired traffic has been carried satisfactorily by a concrete wearing surface, but this experience has been limited to the extent that it should not be taken as a general condition.

No. 6. The English delegates agree with the item as stated by the Reporter, but agree with a further suggestion recommended by the French delegates. This would read, according to the recommendation of the English delegates:

Cement-bound macadam has been successful on roads carrying light traffic not inimical to the macadam type of construction. This process appears to be especially suitable for sections of roads of this category placed under conditions of wear or exposure which are unfavorable to the maintenance of an ordinary stone surfacing.

No. 7. The chief difference of opinion between the conclusions reported and the English opinion of concrete roads is contained in No. 7, and the English delegates suggest that No. 7 should be omitted, on the grounds that it is too sweeping in its action and can not reasonably be put into words which would be suitable both to the General Reporter and the English delegates.

No. 9. The English delegates agree that the subgrade should be, as far as possible, uniform and stable; but, as the original conclusion reads, it appears that the concrete form of construction should in no case be used unless a uniform and stable subgrade is obtainable. It is felt by the English delegates that there are many circumstances where uniform and stable subgrade is not obtainable. In such cases, however, the English delegates would still use concrete-base course. They propose, therefore, that No. 9 should read:

It is desirable that subgrades be uniform and stable.

No. 10, it is proposed, should be amended to read :

Pavement slabs must be designed to carry expected loads, and increase of thickness or additional strengthening at edges appears useful.

It was not quite clear to the English delegates in the original reading of No. 10 whether edges referred to edges of the metal carriageway or the edges of each individual slab forming the wearing surface.

No. 11, it is suggested, should be extended to read as follows :

Longitudinal and transverse joints are commonly used and must be designed to meet traffic, subgrade, and climatic conditions, but in view of the fact that a number of concrete roads have been successfully constructed without joints it is advisable that further research should be made on the whole subject of joints and cracks.

No. 12. There is no amendment offered by the English delegates.

No. 13. In collaboration with the French delegates the English delegates propose the following addition should be made, so that No. 13 would read :

Construction operations are performed mostly by machinery, with resulting lower cost and better workmanship. The value of a cement concrete roadway depends to a large extent on the perfect execution of the work, and in particular to the homogeneity of the concrete.

No. 15. The English delegates suggest it should read as follows :

Maintenance of concrete surfaces, properly constructed, is relatively simple and reasonable in cost, and in particular the upkeep should comprise the immediate filling with suitable material of the expansion joints and of any fissures which may occur.

It may be considered by the meeting that the last item goes into further detail than the general terms of the conclusions should contain, but it is felt by the English and French delegates that the importance of the item added is such that it is likely to be helpful and might be included in the more general terms of the original conclusion.

The CHAIRMAN. I would like to ask Colonel Blackwell one question on conclusion No. 13. In the last sentence of your discussion, after the word "particular"—"particular to the homogeneity of the concrete"—should that not be changed to "on"?

Lieutenant Colonel BLACKWELL. The value depends on the perfect execution of the work, and in particular is taken together and might be changed to read, "and especially to the homogeneity of the concrete." The "in" before "particular" is not a parallel "on" to the preceding "on" with "may depend on."

The CHAIRMAN. Are there any others who wish to discuss any of the conclusions?

M. JEANNIN (France). Gentlemen, the French delegation has studied very carefully the conclusions of our General Reporter and

has sent to him personally the modifications which it proposes to have made in these propositions. Our suggestions have also been mentioned a moment ago by the Reporter of the English delegation. I will, therefore, confine myself to reviewing them rapidly and explaining in a few words the reasons which justify them.

Regarding the sixth conclusion, cement-bound macadam, the report might give the idea that cement-bound macadam is designed primarily to reinforce the road. The French delegation maintains on the contrary that cement-bound macadam is designed for roads in conditions where ordinary macadam would not stand up. We propose, therefore, to add to the sixth conclusion the following statement:

This process—that is to say, the surface of cement-bound macadam—appears to be especially useful for sections of roads of this category—that is to say, roads carrying light traffic—placed under conditions of drainage and exposure unfavorable to the maintenance of ordinary stone surfacing.

We also insist upon the following sentence, stating that a protective wearing surface seems equally indispensable on cement-bound and ordinary stone surfaces.

Conclusion No. 10. The explanation is very brief in the general report, stating that a certain edge thickening is necessary. We may say that in France, and at Paris in particular, there have been constructed concrete roads with a uniform thickness. We do not deny that edge thickening might be necessary but we do not consider that it is essential. We propose, therefore, to change the sentence as follows. "Edge thickening appears useful."

Conclusion No. 11. The general report indicates the reasons why longitudinal and transverse joints are commonly used in concrete roads. The French delegation believes that one of the essential reasons for providing joints is the shrinkage of concrete. The delegation, therefore, suggests that conclusion No. 11 contain also the following words, "and shrinkage of concrete."

Conclusion No. 13. The Reporter of the English delegation has been kind enough to suggest the modification initially proposed by the French delegation and has given his approval to it. We suggest retaining the text of conclusion No. 13, but adding to the last sentence that it is evident that an important factor, if not the most important factor, in the value of a cement-concrete roadway depends upon the perfect execution of the work and above all the homogeneity of the concrete. We propose, therefore, to add the following sentence:

The value of cement-concrete roadway depends to a large extent on the perfect execution of the work and in particular on the homogeneity of the concrete.

Conclusion No. 15. Our proposals have also been indicated by the Reporter of the English delegation. With him, we feel that there should be added a last sentence stating that the maintenance of the roadway should always be executed promptly. This phrase would be as follows:

In particular, maintenance should comprise immediate filling with suitable material of the expansion joints and of any cracks which may occur.

These are the only modifications which the French delegation proposes.

The CHAIRMAN. Is there any further discussion?

In order to expedite the business of this Congress, and to clear the work as fast as possible, the General Reporter agrees in respect to conclusion No. 1 to accept the proposals as submitted by the English and the French delegations.

On No. 4 the General Reporter agrees to accept the suggested amendment.

Likewise on No. 6.

Likewise on No. 9.

The Reporter desires to rewrite or slightly change the wording of No. 10.

No. 11, the Reporter is agreeable to the suggestion.

No. 13 is also agreeable.

And also No. 15.

Under these conditions, it would appear, if there is no further discussion, that this Congress is now in position to adopt a resolution approving the conclusions, with the exception of, for the present, 3, 7, and 10.

Do we have a resolution to the effect that the findings of the General Reporter, as amended by the suggested amendment by the English and the French, be adopted by this Congress?

Maj. FREDERICK CHARLES COOK (England). On behalf of the British delegation, I propose that we approve a resolution agreeing to the conclusions of the Reporter as amended, with the exceptions of 3, 7, and 10.

The CHAIRMAN. Is there a second to that resolution?

(The motion was seconded by Mr. Ernest Paul Wretling, delegate of Sweden.)

It has been regularly moved and seconded that the conclusions recommended by the General Reporter, Mr. Sheets, and amended by the English and the French delegations, be approved with the exception of conclusion No. 3, conclusion No. 7, and conclusion No. 10.

Are there any remarks? If not, all those in favor will say aye. [Ayes.] Opposed, no. [None.]

It is so ordered.

Mr. Sheets has reworded proposal No. 10. I am asking that he read No. 10, because we believe that we can clarify that hastily and pass that by, leaving only two points open for discussion.

The GENERAL REPORTER, No. 10. "Pavement slabs must be designed to carry expected loads. Edge thickening is advantageous as a means of producing an economic and balanced structural design for concrete pavement slabs." This wording and discussion, I think, meets the condition that many pavements have been and are being built successfully without edge thickening. But it recognizes the indisputable scientific fact which has been obtained through expensive highway researches, and I believe that the proposed wording brings that to the attention of the engineering profession in a manner which could not be offensive to anyone.

Lieut. Col. J. E. BLACKWELL (England). The English delegates are prepared to accept this reading of No. 10.

M. JEANNIN (France). The French delegation had requested the omission of the word "necessary" and had proposed the words "appears advantageous." The General Reporter now proposes to replace the word "necessary" by "advantageous." We believe that the phrase might better be ended after this word "advantageous." If either the General Reporter or the Congress holds a contrary idea, we will support the last proposition made.

The CHAIRMAN. Gentlemen, you have heard the reply of the representative from England to agree to accept the proposal as rewritten by the General Reporter. The representative of France suggests that the rewriting should stop after the word "advantageous," but if it is the will of the Congress that the latter part of the sentence be continued in the report he is willing to accede to the wish of the Congress.

Mr. THOMAS SOMERS (Scotland). I would move that the resolution as amended be now adopted by this Congress; that is, on paragraph No. 10.

The CHAIRMAN. Is there a second to that resolution?

(Resolution was seconded by Mr. Bertie Cooper, of England.)

The CHAIRMAN. Gentlemen, you have heard the motion. Are you ready for the question, or are there any remarks?

If not, all those in favor will signify their assent by saying aye. [Ayes.] Opposed. [None.]

It is so ordered.

That leaves but two of the conclusions open for discussion. No. 3 and No. 7. Is there anyone who wishes to discuss further No. 3?

Your chairman is of the firm opinion that there is a misconception of the interpretation of conclusion No. 3 as written by the General Reporter. I would therefore ask that the official delegate of the English delegation and the official delegate of the French

delegation come to the platform for just a few minutes to discuss this problem and see if they can not arrive at something satisfactory to everybody.

The GENERAL REPORTER. The gentlemen of the English and French delegations and the General Reporter are in agreement on an amended reading for No. 3, and we have reached an agreement on the substance of the material that should be incorporated in No. 7.

Cement concrete pavements and also cement concrete base courses protected by appropriate wearing surfaces are suited to heavy traffic.

M. JEANNIN. The French delegation accepts this proposition.

The CHAIRMAN. Is there a second to the motion?

(Motion seconded by Mr. Ernest Paul Wretling, of Sweden.)

The CHAIRMAN. Gentlemen, you have heard the motion. Are there any remarks?

All those in favor of the motion as read by Mr. Sheets please say "aye". [Ayes.] Opposed? [None.]

It is so ordered.

Now what about No. 7?

The GENERAL REPORTER. Mr. Chairman. I suggest that the General Reporter be permitted five minutes in which to suggest a proposed No. 7 to be submitted later in the session for consideration. I will endeavor to come to agreement with the French and the English delegations before presenting the proposal.

The CHAIRMAN. We will be pleased to grant the extension of time to the General Reporter on No. 7, but we will proceed also in the meantime with Question No. 1 (B), brick or other artificial paving.

The General Reporter on this subject is Mr. P. J. Freeman, Chief Engineer, Bureau of Tests and Specifications, Department of Public Works, Allegheny County, Pennsylvania.

The GENERAL REPORTER (Mr. Freeman). The General Reporter was instructed to review the practice of the various countries and summarize it in about 1,000 words. In view of the fact that the practice in various countries is so different, it was found difficult to draw many general conclusions. There is such a wide variation in the practice that I believe it will be necessary to read the report. [Reading:]

RESULTS OBTAINED BY USE OF BRICK OR OTHER ARTIFICIAL PAVING

From the information given by the reporters for various European countries, brick or other artificial pavements are not used to any great extent in Denmark, Italy, Irish Free State, Spain, Sweden, and Switzerland.

Brick is by far the most important artificial road material used in Holland, and the manufacture of brick has always been a very important industry. Of the national roads embracing in general the more important highways with a total length of 2,200 kilometers, more than 1,200 kilometers are made of brick, having a total surfaced area of approximately 4,500,000 square meters. About

52 per cent of the total surface of streets in Amsterdam are paved with brick and 43 per cent of the streets in The Hague are paved with brick. The annual production in Holland amounts, at present, to about 500,000,000 bricks.

The Reporter includes this because Holland is the country using the greatest number of brick other than the United States.

At the present time no uniform method of testing brick for all Holland has been adopted. There are a number of tests prescribed by various authorities, such as water absorption, compression, wear by means of a sand blast, drop test, and ball compression test. Of all these requirements, the ball compression test appears to give the best results as an indication as to the durability of the paving brick.

There follows a very brief description of this ball compression test which I will not read.

[Reading, continued:]

In general, the depth of paving brick used in European countries has been less than that in the United States and the amount of vibration has also been lower than in the United States.

In other words, the brick used in European countries has usually been softer than the paving brick used in the United States.

In 1928 the Minister of Public Works of Poland sent experts throughout western Europe to study paving production with the idea of raising the standard of the industry in Poland to the highest technical level. Experience in Poland had shown that roads paved with brick having a good quality were suitable under military traffic and with the recent development of high-class paving brick further extension of the use of that material for paving may be expected.

In Belgium, France, and Germany experience has shown that the durability of brick pavements is affected by the quality of the brick, and more attention is being paid to the methods of making and turning paving brick.

Contrary to the practice in the United States, where paving brick is considered one of the most suitable materials for very heavy traffic, both as to number of vehicles and loading, it appears from reports from continental Europe that brick paving has been most generally used for medium and light traffic.

It has been found that good European practice indicates that the paving bricks should not be placed on a rigid base, particularly one made of concrete.

The report from Holland specifically states that concrete bases are not suitable for use under brick, which is exactly contrary to best practice in the United States. You can see how the General Reporter worried about drawing conclusions.

[Reading, continued:]

Many of the brick pavements are laid directly on the subgrade or upon a heavy layer of granular material, such as sand, which provides adequate drainage.

It has been found that unless the brick are of the highest quality, they tend to pulverize under heavy traffic if laid on a solid base or foundation.

Under certain conditions it has been found unnecessary to fill between the brick with any material as the sweepings from the streets soon adequately fill the spaces between the brick.

In this country we would think that, of course, a very peculiar practice, but hundreds of millions of brick have been laid by that method, and apparently with quite satisfactory use.

Pavements in the country are filled with sand or bituminous materials where traffic conditions make it necessary.

The countries of continental Europe are all developing paving brick of a higher quality than in the past, and these countries are building experimental pavements under the most modern methods of design. This is also true of Great Britain, where the first experimental brick pavement was laid in 1922.

It would appear that the development of paving brick can be advanced if a uniform specification which is acceptable to the various countries could be developed. At the present time there does not appear to be any uniformity as to the physical requirements for paving brick used in various parts of the same country.

Even in Holland, where 500,000,000 brick annually are used, they apparently have many methods or techniques.

[Reading, continued:]

Through the efforts of the National Paving Brick Manufacturers' Association the rattle test for abrasion loss of paving brick has been made a standard by the American Society for Testing Materials, and this test has done much to standardize the methods of production and the quality of paving brick in the United States. This test is also used to a limited extent in European countries.

An attempt will be made to summarize the general trend of methods for the construction of brick pavements in the various countries, but these methods represent special practice of highway engineers rather than the general present-day practice of the various countries.

The report now brings forth various modern practices which are being used quite extensively in the United States; to a limited extent in the other countries reporting.

[Reading, continued:]

Fire clay and shale brick are used in the various countries.

Portland cement grout filler has been used and is still being used to a less extent than formerly.

Bituminous fillers are taking its place for various reasons, which you will find set forth in the report of the American delegation.

As another artificial pavement we have rubber, which has been used in Great Britain since 1913. Several types of paving block have been tried; various sizes and shapes. Rubber pavements have been tried in the United States to a limited extent, but a method of holding the rubber surface to the base has not yet been perfected.

Stone block paving.—Stone block pavements are considered natural pavements by the European countries rather than artificial pavements. In the United States block pavements have been constructed of granite, trap, sandstone, and limestone. The method of laying stone block pavements is practically the same as for paving brick. The joints are usually filled with a mastic consisting of approximately equal portions of sand and an asphalt filler rather than pure bituminous filler as is used for paving brick. In some

cases cement grout filler consisting of equal parts of Portland cement and sand are used. Stone block pavements on adequate foundations are considered suitable for the heaviest type of traffic.

There is no general agreement among the countries using brick for pavements on the two following items:

Methods of construction and necessity for using fillers.

Specifications for paving brick and methods of testing.

All of the countries are in general agreement that proper drainage of the subgrade is a vital factor in the production of a durable pavement. I think that is the only thing that they all agree on.

The General Reporter, after discussion with some of the various delegations, prepared the following conclusions:

Brick paving.—Subject to suitable foundation, brick will make satisfactory paving for light, medium, or heavy traffic, according to the country in which it is used.

Specifications and tests for paving brick should be prepared and submitted to the next Congress, with a view to standardization.

Rubber paving.—Rubber-block paving has had a limited application so far. It is, however, a silent paving and suitable for certain positions in large towns. Research should therefore be continued in the following directions:

- (a) Most suitable quality of rubber for street paving.
- (b) Most suitable type of block and method of laying.
- (c) Production and methods of application of a suitable joining material.
- (d) Reduction in cost.

This concludes the General Reporter's discussion of the various papers submitted.

The CHAIRMAN. Gentlemen, you have just heard Mr. Freeman, the General Reporter, on Results Obtained by the Use of Bricks or Other Artificial Paving. He has drawn two conclusions on brick paving, and a recommendation on others, as read. Shall we adopt the conclusions as read, or do you desire further information?

Mr. EDWARD E. EVANS (England). On behalf of the British delegation, I take pleasure in moving that the general conclusions read by Mr. Freeman be adopted by this meeting.

The CHAIRMAN. Do we hear a second to the resolution?

The French delegation offers a second to the resolution.

Are there any remarks?

Dr. Ing. AUGUST DEIDESHEIMER (Germany). At the first International Road Congress in Paris in 1908, I had the honor to describe "Vulkanol" paving, so named because its making imitated the volcanic process. The stone fragments were heated to the melting point and formed under pressure into blocks from 6 to 8 centimeters in thickness and 21 to 29 centimeters square. Later the large plant in Germany was dismantled during the war and since that time "Vulkanol" has not been produced. In regard to the conclusion 1 of the General Report on brick or slag block pavement, it would be desirable to have "Vulkanol" included.

"Vulkanol" arose at the beginning of the century from the need of the stone industry to find a means of utilizing its surplus waste material. I now have the honor to introduce a process, which also arises from the necessity of the industry because of the difficulty of disposing of ordinary sizes of stone. This is now called, in Germany, "Riesenschotter."

Doctor DEIDESHEIMER then described this process which consists in the use of large irregular stones, usually regarded as a cheap waste product of the stone quarries, well rolled into a foundation formed by a bed of chips, the joints being filled with chips and sand which is consolidated by washing with water and by rolling. The joints are then sealed with an asphaltic emulsion. The whole, from 9 to 12 centimeters thick, according to the dimension of the stone used, contains 97 per cent of hard materials and 3 per cent of asphalt.

The CHAIRMAN. Listening to the comments of Doctor Deidesheimer, it would appear to the chair that he has inserted other material on the use of block stone, and is off the question. However, if he wishes to prepare other conclusions and present them to this Congress for another session, it will be perfectly satisfactory for him so to do.

We will ask any others who wish to discuss Question 1 B to please confine themselves to the question, "Bricks or other artificial paving."

Mr. DIMITRI P. KRYNINE (United States). As to the question of brick paving, it appears that this method of construction is very important for new or less developed countries. It is true, as the German report indicates, that in view of the availability of many types of tar or asphaltic pavements at lower prices, it can hardly be supposed that the building of pavements of vitrified bricks should take much larger extension upon rural roads. In fact, the cost of transporting construction materials in the form of vitrified brick is never economical in comparison with other materials for roads of certain length. But when we are dealing with roads surrounding a city and forming a "knot" around it, bricks may become economical on condition naturally that the country possesses good clay and fuel. Such, it would appear, is the case in Poland and in many Russian cities.

Regarding the indications of the French and Dutch reports on the laying of bricks in chevrons or in crosses it should be added that one may conceive of two methods of construction: One according to the drawing on page 20 of the Dutch report, and the other in turning the same drawing to an angle of 90°. Following the practice of the Russian road, Kiev-Tchernigoff, where the two methods have been used, the second requires less maintenance cost, the transversal profile being more stable; on the other hand, for the comfort of travelers

the first type is preferable. As to the dressing of brieks upon the edges of the roadway (Dutch report, p. 20), this could also be avoided by filling the empty spaces with the same briek broken and tamped in place.

Now, I want to add another word concerning soil mechanics. This science has become well developed in the United States, in Germany, in Russia, and in other countries. Its contributions to the art of constructing concrete roads have been studied by the Bureau of Public Roads of the United States, and the work of this bureau, seconded by Doctor Terzaghi is so important and interesting that any modern engineer is obliged to know of it in order to be able to apply its results to his daily work. I therefore suggest that the application of soil mechanics to the art of constructing roads be included in some way or other in the program of the next (Seventh) Road Congress.

The CHAIRMAN. Is there any further discussion on the resolution proposed by the General Reporter, Mr. Freeman, on Question 1 B?

The question being called for, all those in favor will say "aye." [Ayes.] All opposed? [None.]

It is so ordered.

The CHAIRMAN. Mr. Sheets, are you ready now to report on Question 1 A, No. 7?

The GENERAL REPORTER (Mr. Sheets). Mr. Chairman, the gentlemen of the English and French delegations and the General Reporter on Question 1 A, have come to an agreement.

In designing cement-concrete pavements and cement-concrete base courses to be surfaced with other materials, the resulting pavements should have equal load-carrying capacity or structural strength when similar traffic conditions are to be met.

The CHAIRMAN. It has been moved by the delegate from England and seconded by the delegate from France that conclusion No. 7 as rewritten and read by Mr. Sheets be adopted.

Is there anyone who wishes to discuss this conclusion?

All those in favor will say "aye." [Ayes.] All opposed? [None.]

It is so ordered.

The CHAIRMAN. To the delegates of the countries represented at the First Section of this International Road Congress we are deeply indebted to you for your attention to the business coming before this Section this morning, and we wish to thank you one and all for the cooperation extended to the chair and to the other delegations.

The General Reporters wish me to extend to you their thanks for your kind attention and wonderful cooperation.

Immediately after the adjournment of this meeting Section No. 2 will come to this hall for a joint meeting for but a very few minutes.

(Whereupon the meeting of the First Section adjourned.)

JOINT MEETING OF THE FIRST SECTION WITH THE SECOND
SECTION, 12 NOON, OCTOBER 7, 1930

The PRESIDENT GENERAL (Mr. Roy D. Chapin). A very sad event has happened to some of the citizens of one of the countries belonging to this Congress. The Vice President of the International Association will now address you.

M. EDMOND CHAIX. Vice President of the International Association. Gentlemen, while on our way to attend this Congress we learned of the terrible misfortune which has struck down that magnificent engine of the air, the great English dirigible, which had commenced its voyage toward distant regions. In the course of its voyage over France an accident hurled the dirigible, its passengers, and its crew upon the soil of France. I learned yesterday from the ambassador of France that his country, desiring to manifest both its sorrow and its affection for the British Nation, had decided that to-day should be a day of national mourning in France. I wish to ask you, gentlemen, in this remembrance of so many nations, to join now in extending our affection and our admiration to the great British Nation and particularly to the English delegation which is here among us and to the chief of that delegation. I ask you, gentlemen, to draw together in that unity which creates cordial and benevolent relations among all countries and which on occasions like this establishes relations of profound and sincere affection.

I request, gentlemen, that you will observe a minute of silence during which we will lift our hearts toward those who are no more, who have given their lives for the science of aerial locomotion and the progress of humanity, and who are martyrs to their will and to their ideal.

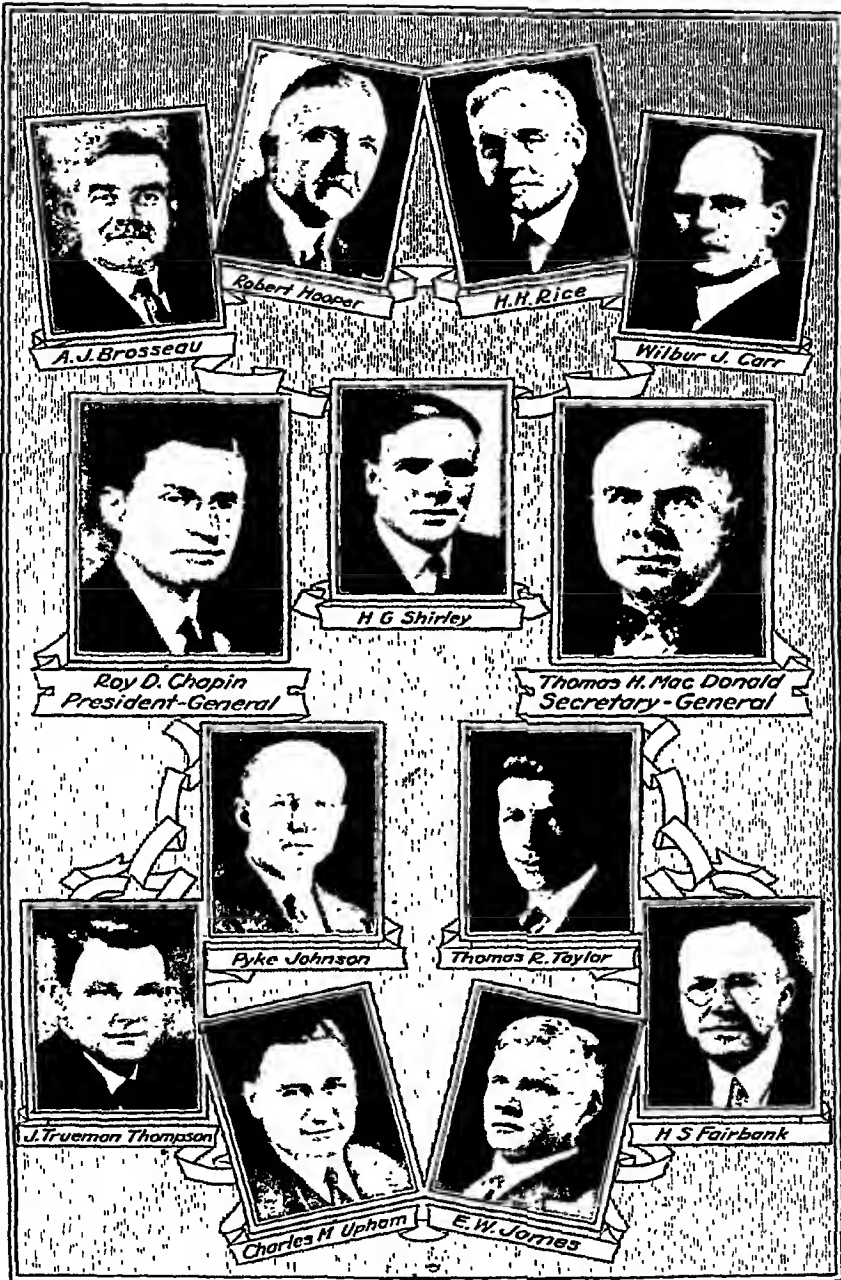
The PRESIDENT GENERAL. We shall now observe one minute of silent mourning.

(Silent pause.)

The PRESIDENT GENERAL. A member of the British delegation wishes to say a word.

Maj. F. C. COOK (England). On behalf of the delegates of the United Kingdom, of the overseas Dominions and dependencies, I have been given an opportunity of expressing our gratitude for the kindly thought which has prompted your action to-day. We shall notify the British Government by cable: The loss of this airship is part of the price the nations pay for the mastery of the elements. We are conscious of the sadness which must exist in many British homes to-day. Our countrymen have laid down their lives in the execution of their duty, but their places will be filled.

(Adjournment of joint meeting.)



AMERICAN ORGANIZING COMMISSION
EXECUTIVE OFFICERS

SECTION 2.—SESSION OF TUESDAY FORENOON, OCTOBER 7, 1930

FOURTH QUESTION.—WAYS AND MEANS OF FINANCING HIGHWAYS

ALVAN MACAULEY, Chairman.

H. H. KELLY, Secretary.

The CHAIRMAN. The meeting is formally opened.

The problems surrounding the financing of highways arose with a spread in the use of motor cars, or at least the world-wide use of these vehicles has multiplied the problem a hundredfold, and there is still no entire and complete agreement as to the one best way to finance highways. Circumstances have to be considered, of course.

But opinion is rapidly crystallizing as to the general principles involved. The unanimous agreement of the gentlemen in the distinguished gathering before me as to the essentials of sound financing of highways would go far toward settling the matter for all time.

I take pleasure in introducing Col. A. B. Barber, the General Reporter, who will lead the discussion on the Fourth Question—Ways and Means of Financing Highways.

The GENERAL REPORTER (Col. A. B. Barber). Mr. Chairman, ladies and gentlemen, we had 11 reports on the subject of Ways and Means of Financing Highways. Your General Reporter was struck with the great contrast between these reports and those of the Congress of London when this subject was previously discussed. In the intervening time, it seems that our highway transportation by motor vehicles has been converted from something which was regarded as largely of the luxury class into one of the most necessary and important parts of our economic structure.

I was struck by the degree to which the reports of all the various countries recognized that the motor vehicle itself, through its licenses, and in a large number of countries, the gasoline tax, is in large measure paying its own way, and this fact also gives a further business basis on which our highway transportation can be put.

A second general note running through all of the reports was the insufficiency of our existing highways, and the urgent need for application of all the means which we can afford for their progressive improvement.

Due to the fact that of the 11 reports 9 were from the well-developed European countries and the other two were from Siam and the United States, your General Reporter felt it desirable to take cog-

nizance of the conclusions of the Pan American Highway Congress which took place at Rio de Janeiro in 1929, thus giving recognition to the expression of a number of the South American and Central American countries and Mexico with regard to the problems before this Congress.

I trust this action meets with your approval. The conclusions drawn from a study of all the reports have been submitted to you in printed form. Here they are again:

1. The motor vehicle with increasing use creates demand for large expenditures for reconstruction and improvement of existing highways to new standards, construction of new highways and effective maintenance of all improved highways. It justifies such expenditures through improved economy and efficiency of transportation within areas previously served by highway transport and through extension of economic commercial and social access to new and wider areas.

2. No country has as yet approached completion of its major highway system to the new standards and all countries face heavy demands for greater attention to accommodating their secondary and local roads to the needs of motor traffic. Though differing widely in character and degree in different countries, the problems of highway finance are universal and urgent.

3. To meet the large financial problems involved and to secure the fullest and quickest benefits from the new form of transportation, it is specially important that highway programs covering a period of years be set up well in advance and carefully budgeted. Adjustments to meet changing conditions and improved methods can readily be made as developments may require.

4. To facilitate financing and administration, and as a guide in determining the kind and extent of improvement, all highways should, as far as practicable, be classified according to the characteristics of their prevailing traffic as to origin, destination, and importance. Classifications usually applicable are:

(a) General use highways:

(1) Main or national highways.

(2) Secondary, departmental, provincial or, in countries of smaller geographical area, county highways.

(b) Local highways:

(1) Local, vicinal, or communal roads.

(2) Urban streets, including sections of main or secondary highways.

(c) Special highways: Military roads, autostrades, etc.

The first group includes the highways of general use, i. e., highways which receive traffic from a number of local roads or from a city or town and carry a considerable proportion of traffic into or through more than one rural jurisdiction. Every public highway should be definitely assigned to the appropriate class and responsibility therefor be fixed upon the authorities of the proper political unit.

5. In countries of vast area and sparse population financial limitations and traffic needs may direct primary attention to early development to minimum all-year standards of highways of secondary or local character, to give access to rail or water transport lines. As highway development progresses, however, such secondary and local systems tend to integrate and through routes become identified with consequent demand and financial justification for higher

type construction. It is important in the interest of ultimate economy that the requirements of the future main highway systems be considered in planning earlier highway development.

6. To promote efficiency of programming and administration highway authorities of higher jurisdictions should have actual supervisory or advisory relationship to the lower jurisdictions. The granting of subsidies or loans by the national to the lower jurisdictions under suitable conditions is an effective means of exercising the desired influence and of assuring financial possibility of carrying out highway programs in charge of lower jurisdictions having aspects of national concern, including special attention to undeveloped sections.

7. Provision for systematic maintenance of all highways after improvement is an essential feature of a sound highway program. If proper types of highways in relation to the character and volume of traffic are provided, maintenance costs should be less than with inadequate highways handling the same traffic. In making provision for maintenance, however, it should be borne in mind that traffic on improved highways tends to increase rapidly and, while the improvement thus benefits the users, it may increase the total of maintenance costs. For this reason maintenance of improved highways of general use, or at least any increase over the former normal maintenance costs, should be regarded as a first charge upon the user revenues.

8. The cost of constructing, improving, and maintaining adequate highway systems should be distributed equitably in relation to the direct and indirect benefits derived, taking into consideration the taxable capacity of those benefited. Wide difference of conditions and institutions in various countries makes it impossible to establish any fixed formula for general application but certain conclusions based on recent trends can be stated:

(a) Due to the benefits to society, business and property in general the application of general tax revenues to highway purposes should continue, the amounts being dependent upon the needs for highways, the funds available and the demands for other purposes in the public budget. General taxes, carrying as they do a direct accountability to public opinion for efficient expenditure, are a particularly appropriate source of revenue for work on local roads, including urban streets.

(b) Assessment of abutting property should continue in urban areas but in agricultural areas only in proportion to actual benefit from the degree of improvement useful to such property. Thus where highways have been brought up to the standard needed for agricultural uses, special assessments on such land should where practicable be abandoned. Certain countries have already relieved agricultural lands of all taxation for highway purposes.

(c) Up to the limit where they become an undue burden upon users of the highways, user taxes, including license fees and fuel taxes, afford an important and increasing source of highway finance. If such taxes are made unduly high or if the burdens upon vehicle owners are unnecessarily increased by excessive import duties in predominantly agricultural, nonmanufacturing countries, they tend to bring to bear the law of diminishing returns as well as deprive the public of the benefits of normal development of motor transportation. For the same reasons user taxes should be applied exclusively for highway purposes. To provide uniformity over reasonable areas they should be imposed only by one of the higher jurisdictions. To maintain the sense of responsibility for collection and expenditure, they should in principle be expended by or under supervision of the collecting jurisdiction and, at least for the present, only on highways of general use (including the sections thereof within municipalities).

9. Because of the prevailing inadequacy of financial resources to permit prompt completion of highway systems corresponding to the economic requirements of motor transportation, and because of the investment character of improved highways from which experience shows increasing returns in the form of user taxes may be expected, bond issues for highway construction and improvement are desirable in most countries. Such bond issues should, however, be limited to actual requirements for economically justified construction or improvement projects, under sound administration and with subsequent maintenance provided for out of current revenues. The bonds, if based primarily on user revenues for interest and redemption, which according to experience can be fully covered by such revenues under favorable conditions of highly developed motor transport, should nevertheless be backed by the full credit of the State. Bonds should be serial in form with maturities so arranged that annual requirements of principal and interest will be as nearly uniform as practicable. As more than half the cost of any highway represents grading, drainage, structures, engineering, rights of way, etc., which are of practically indefinite life and as the other portions have life well beyond the period of amortization thereof under the serial form, the term of bonds for construction of main highways may be 30 years and for improved secondary highways 20 years. When the needs for expedited highway construction and improvement have been met the use of bond issues should be discontinued and the pay-as-you-go basis followed, especially in cases where capital expenditures recur in each annual budget.

Since the printed pamphlets were distributed your General Reporter has had the benefit of certain criticisms thereof and recognizes certain errors in his work which he desires to correct.

In the interest of expeditious procedure, perhaps it would be well if I should state the few changes which I propose while proceeding to the consideration of the conclusions, one after the other. [Assent.]

The CHAIRMAN. The first conclusion is before the Section, and in order to conserve our time, unless there is a special request, we will not read it because it is before you. Is there discussion?

The GENERAL REPORTER. In the second sentence, after the words "efficiency of transportation," it is proposed to insert the word "especially." [Assent.]

The CHAIRMAN. If there is no discussion, I call for a vote on the motion.

(Unanimously carried.)

Conclusions Nos. 2 and 3 are unanimously carried without any change.

The CHAIRMAN. As to conclusion 4, what is your pleasure?

The GENERAL REPORTER. In paragraph 4 (a) it is proposed to add, after the words "general use highways," the following expression in parentheses "(including urban streets which form part of such highways)"; and, at the end of paragraph 4 (b), to eliminate the expression "including sections of main or secondary highways" and substitute the following references in parentheses "except as indi-

eated in subparagraph (a) above." I think the reason for this change is very clear.

Dr. MICHELE CARLO ISACCO (Italy). I wish to make certain remarks upon the fourth point of the conclusions. I have nothing to observe regarding the necessity of a classification of roads based upon the intensity of traffic, but when the question arises of indicating the various categories, one encounters remarkable differences in the conditions and requirements of the various countries, a fact which makes it necessary to omit from the conclusions of an international assemblage, in my opinion, anything incompatible with these differences. As regards my country—Italy—past experience shows us that the smallest administrative units—that is to say, the communes—have shown themselves little able, financially or technically, to accomplish satisfactorily the task of improvement or maintenance of roads entrusted to them up to the present. One could hardly except even the communes of the large cities whose means and labors are too much absorbed by the requirements of the city streets. Since, on the other hand, we recognize the public interest of the majority of these communal roads, we are considering grouping them with all the other secondary roads, now known as provincial, under the administration of the largest local units; that is, the provinces. The vicinal roads, which under our system include only roads serving a certain number of rural properties, would remain entrusted to associations of the interested parties, under the control of and with some aid from, the public authorities.

This being the case I should request our General Reporter to modify his proposed classification by grouping in a first category the roads which constitute the system of chief communications or national roads, as you call them, and to group in a second category all the secondary roads, whether they be provincial, departmental, or communal. Since the character of "public interest," even when localized and referring to the population of a determined district, should not be less recognized as a public interest, this category would be in its turn susceptible to subdivisions according to the special conditions in each country.

With this slight modification we should be able to accept entirely this conclusion which thus would not be in conflict with the legislative reform now being adopted in our country.

The GENERAL REPORTER. Mr. Chairman, it is my understanding that the Italian delegate desires to have embraced in one category certain classes of local routes and of generally used highways, due to the fact that this grouping is under way in certain reorganizations of highway administration taking place in Italy.

My impression is that the classification which we are proposing is merely for clarification of thought upon the character of service to be rendered for various types of highways, and that it in no way would interfere with the grouping of several classes of those highways under a single jurisdiction if any country desired to make such grouping for administrative purposes.

On the other hand, I should find it very difficult, considering the service rendered, the functions in highway transportation of the several classes of highways, to group local and general-use highways under a single category.

I would therefore like to ask the Italian delegate to consider from my remarks just made that there is nothing whatsoever in the conclusion as stated to prevent any governments or subordinate governments from making any grouping that they desire for administrative purposes.

In case the Italian delegate feels that the remarks just made do not cover the needs of the situation, and as I may not have perfectly understood his purpose, I would suggest that he formulate a suggested change in the conclusions which we might then consider.

Dr. MICHELE CARLO ISACCO (Italy). Following the statement of the General Reporter, I shall not insist upon my suggestion, and I may explain that my observations concerned only the necessary reservations, due to the reform which is about to be adopted in my country. I should say at this point that I thoroughly understood the purpose of this separation as regards the local roads. My intention was only to point out that the character of general interest, attributed to the secondary roads is not lacking also in the majority of local roads; that the characteristic of "general interest," which in this classification is exclusively attributed to No. 2 of letter A; that is to say, in the secondary, departmental, or municipal roads is none the less applicable to most of the roads which are called communal or local.

If a suggestion might be made, it would be to omit under letter (b), No. 1, the word "communal" and to transpose it to No. 2 of letter (a). In this way, in the category (b), local roads, there would be included only what we call vicinal routes—that is to say, rural routes—those which interest only several properties, but which do not have any general interest for the entire population of a commune.

The GENERAL REPORTER. The General Reporter understands the proposal of the Italian delegate to be the transference of the classification "communal roads" from category (b) 1. to category (a) 2.

I would have no objection to this change if it fits the Italian conditions, provided it does not contravene the understanding of the term "communal" in other countries. If it did, I think it would only introduce confusion in the classification.

M. LIPMANN (France). Gentlemen, it is difficult for the French delegation to accept the proposition which has just been made by our colleague of the Italian delegation for the following reason: In France we are now considering the classification under the name of "communal routes," of a number of roads which at present are vicinal or local roads. In the end we would have in France only three general categories of highways: National highways, departmental roads, and communal roads.

If there were some way to arrange the classification of roads so that all countries here represented might be satisfied, we would suggest nothing better than to abandon in the classification which has been proposed the idea of general or local interest, and in consequence to omit the items: (a) Roads of general interest; (b) local roads; (c) special roads; and to replace (b) 1, (b) 2, and (c) by the numbers 3, 4, and 5.

Sr. ISACCO (Italy). I accept the proposition of the French delegate—that is to say, the omission of the designations *a* and *b* roads of general interest and local roads. Only I add a proposition which I hope will be accepted by our friends—that is, the omission likewise of the word "vicinal" after "local roads," for this word "vicinal" has a very different meaning in the different countries. As I explained, in Italy vicinal roads are not even public roads; they are simply means of access to private properties. To avoid all confusion it seems to me that this change is necessary.

The GENERAL REPORTER. Mr. Chairman, I think there is a considerable interest in preserving the two headings: (a) General-use highways and (b) local highways.

Studies of traffic and of administration of highways indicate the growing importance in this distinction, which also has significance from the point of view of finance, when the application of the usual revenues is considered. I do not think that because of a small difference in regard to the details of subdivision 4 (b) 1 that we should abandon the conception of general-use highways on the one hand and local-use highways on the other.

Therefore, if it is agreeable to the delegates of Italy and France, I would propose that we simply eliminate the words "vicinal or communal" and leave 4 (b) 1 to read simply "local roads"; then each country can imply the interpretation that it desires.

M. LIPMANN (France). Gentlemen, the French delegation is entirely in agreement with the proposition which our General Reporter has just made, but I wish to remark that as regards the editing of this proposition we now find ourselves with the following text: (b) Local roads, with the subtitles (1) local roads; (2) city roads or streets. Consequently the subtitle (1) only repeats what has been

said in the title without adding anything. Perhaps it would be better to restate the title (b) as "roads of local interest."

The GENERAL REPORTER. The suggestion of the French delegate will certainly be most happily accepted by the General Reporter.

The CHAIRMAN. If there is no objection, I call for your vote on the approval of conclusion 4, according to the proposal of the General Reporter and with the change suggested by the delegate from France.

The chair takes it that that is agreeable to every one. [Unanimously carried.]

The CHAIRMAN. We therefore come to the consideration of conclusion 5.

Any remarks, gentlemen? [Unanimously carried.]

The CHAIRMAN. And now as to the conclusion 6, what is your pleasure?

The GENERAL REPORTER. In the first sentence it is suggested to omit the word "actual."

The CHAIRMAN. Any discussion, gentlemen? [Unanimously carried.]

The CHAIRMAN. Section 7, now. Any remarks? [Unanimously carried.]

The CHAIRMAN. As to the conclusion No. 8, what is your pleasure? We will take it up in subsections.

The GENERAL REPORTER. In paragraph 8 (a) change the first sentence to read as follows: "Application of general tax revenues to highway purposes is desirable and should continue."

The CHAIRMAN. Are there any remarks? [Adopted.]

The GENERAL REPORTER. Change paragraph 8 (b), to read as follows: "Any assessment of abutting or other benefited property, chiefly in urban districts and their environs, should be proportional to the actual benefit to such property."

The CHAIRMAN. Any observation? [Adopted.]

The GENERAL REPORTER. In paragraph 8 (c) change the fourth sentence to read as follows: "To provide uniformity over reasonable areas they should be imposed only by rules fixed by one of the higher jurisdictions." And in the last sentence, omit the words "by or" and change "jurisdiction" to "unit of government."

M. LIPMANN (France). Gentlemen, the French delegation requests that in paragraph c the third phrase "for the same reasons user taxes should be applied exclusively for highway purposes" be replaced by another expressing a less imperative idea. We recognize with the distinguished General Reporter that it would be desirable to have the total amount of these taxes applied to highway work, but in France the Government gives for highways only an amount

inferior to the total of these taxes, and we are convinced that the Government would not be willing to deprive its treasury of all resources coming from the users of roads. It would be, therefore, somewhat embarrassing for us to join in a conclusion which would appear to request of the French Government financial regulations so different from those which it has followed up to the present time.

On the other hand, we would give our support to any resolution, which, while conserving the fundamental thought of the General Reporter, would leave to the public authorities a certain latitude in its application. We suggest, for example, the following text: "The attention of public authorities should be called to the interest there would be for them in applying the product of these taxes, in the largest possible measure, to highway work."

The GENERAL REPORTER. We are here discussing one of the very important questions before this gathering. In those countries which have been so fortunate as to have the motor vehicle regarded from the outset as an instrument of business and general public welfare instead of a luxury, there is in time of financial difficulty a tendency on the part of certain public authorities to reach out in every direction for the most available revenue. At the present time we are aware in several countries of a tendency on the part of the political authority to reach out in increasing measure for motor-vehicle revenues and to divert them to other uses, necessarily to the detriment of this business of highway transportation. From the point of view of the General Reporter, reflecting, I believe, the practically unanimous, if not the unanimous expression of the reports received, including that of the French Reporter, the principle of consecration of motor-vehicle revenues to highway and traffic purposes should, if not now, at any rate as soon as possible, be inviolable.

Both from the practical and from the theoretical point of view this is perfectly sound. In the business of highway transportation we have a partnership between government which provides the ways of communication and the highway user with the public generally benefiting from the improvement also a participant through general taxation.

It is very significant that the motor users have in their own interest been willing to accept such heavy burdens of taxation upon the motor user and the reason for which they have accepted these burdens of taxation willingly has been because they have had the understanding that those revenues were going to be applied to highway improvement and maintenance purposes.

For all of these reasons and particularly because of the very sensitive and acute situations in certain countries at the present moment, your General Reporter would regard it as particularly unfortunate

if this body of leaders of the highway movement should in any way indicate a weakness in their conviction on this important point.

I have had the opportunity to receive from the French delegation a communication making the same suggestion now offered. I have discussed the matter with them, and I am pleased to say that, according to their verbal reports more recent than the report submitted by their Reporter, there has been some considerable progress made in France toward the return of motor-vehicle revenues from other applications to be applied for highway purposes.

Members of the French delegation have advised me that whereas their report, submitted last year, showed that only 43 per cent of the total motor-vehicle revenues were applied to highway purposes, there are now so applied about 60 per cent. It is also significant that the French report shows that the total expenditures of about 2,300,000,000 francs is approximately equal to the total revenues of the French treasury from motor-vehicle sources.

I have taken the opportunity to consult the members of the American delegation and have had the opportunity to consult one or two of the other delegations with regard to the proposed change, and I find that they are strongly in opposition to any change in this particular statement.

As indicated in my preliminary remarks on this subject, I believe it is one of the very important questions that we have before us; and from the point of view of your General Reporter, we feel that we should not make any change in this declaration. [Applause.]

Sir SRYMOUR WILLIAMS (England). On behalf of the English delegation, we desire to support the report as it at present stands. There are two points to be considered. First of all, the application of the revenue raised by the government, as to which, of course, each state must decide for itself. But we strongly object to any local authority diverting from highway purposes any draft or taxes raised for highway purposes. We therefore support the report as it stands.

Mr. EDWARD J. MERRIN (United States). On behalf of the delegates from the United States, I want to support the declaration of the Reporter as written. There is hardly any feature of the report on which the American delegation has such a unanimous judgment.

The exclusive use of user taxes in the United States for road work has been one of the most important factors in the rapid extension of our road program. Furthermore, any deviation from this principle would undoubtedly result in serious objection from the motorists and a halting of our rapidly developing road program.

It seems to be well agreed, even by those who would like to alter the declaration, that the declaration in principle is sound. If that

be the case, this seems an extraordinary opportunity for the road officials and the road engineers of the whole world to make a firm declaration for the principle. If it can not be carried out in its fullness in every country, at least the road officials will have the great indorsement of this body for the establishment of the principle in practice.

The delegates from the United States, therefore, hope that their colleagues from the other countries, and particularly from France, will find in this declaration an opportunity to start into effect or toward effect in their own country this sound declaration. [Applause.]

Dr. WERNER FEILCHENFELD (Germany). Gentlemen, as a member of the German delegation which has devoted its attention especially to the gasoline tax, and as a few weeks ago I had to make a report about European conditions at the North American Gasoline Tax Congress, I should like to draw your attention to the question of making use of the gasoline tax in Europe.

The Reporter a little while ago pointed correctly to the necessity of complete use of the automobile-tax receipts for street purposes. In this motherland of motoring it is understood that the gasoline tax is imposed upon automobilists and therefore also used for automobilists. The first point we have imitated in Europe, but, I am sorry to say, not the latter.

In the European countries that are most important from a motor-ing standpoint the gasoline tax is a general tax which is usually collected in the form of an import duty. The following statistics will show how high the rate of the gasoline tax is. From the standpoint of the motorists I figure the tax as a part of the selling price of the gasoline. If my figures are correct, there is collected as gasoline tax in Italy 50 per cent of the selling price, in France 45 per cent, in England 23 per cent, in Germany 22 per cent, and in Denmark and Sweden about 20 to 21 per cent. So you see that it is precisely those countries with the largest gasoline tax which do not use the receipts for road or automobile purposes. I do not have to add at this point what advantages the gasoline tax has as an automobile tax, how it makes it easier for the states to lower or do away with the registration fee which must be paid in one sum. The registration fee always acts on the sale of automobiles as an addition to the purchase price, therefore each registration fee basically hinders the increase of automobile sales. It would therefore be a healthy development in the future to turn more to gasoline taxes and less to registration fees. Because of the rôle which the gasoline tax ought to play in the future of automobile taxation, I would be

glad if this Congress would emphasize the exclusive use of gasoline-tax receipts for road-improvement purposes.

The CHAIRMAN. Any others desiring to be heard before a vote is called for? [No response.]

If not, the chair will put the question. All in favor of conclusion 8 (c) with the amendments proposed by the General Reporter will signify by saying aye. [Ayes.] Contrary? [None.] Carried.

The CHAIRMAN. Now, gentlemen, as to conclusion 9.

The GENERAL REPORTER. In the first sentence, after the words "bond issues," I propose to insert "or other methods of borrowing."

In the third sentence, change the word "state" to "unit of government."

Omit the fourth sentence dealing with the form of bonds; this was regarded as an unnecessary technical detail of financing.

Change the fifth sentence to read: "The period of amortization of loans for highway construction should not exceed the life of the improvement." There was encountered a certain feeling that the mentioning of specific periods of 30 and 20 years was perhaps too definite and too much in detail.

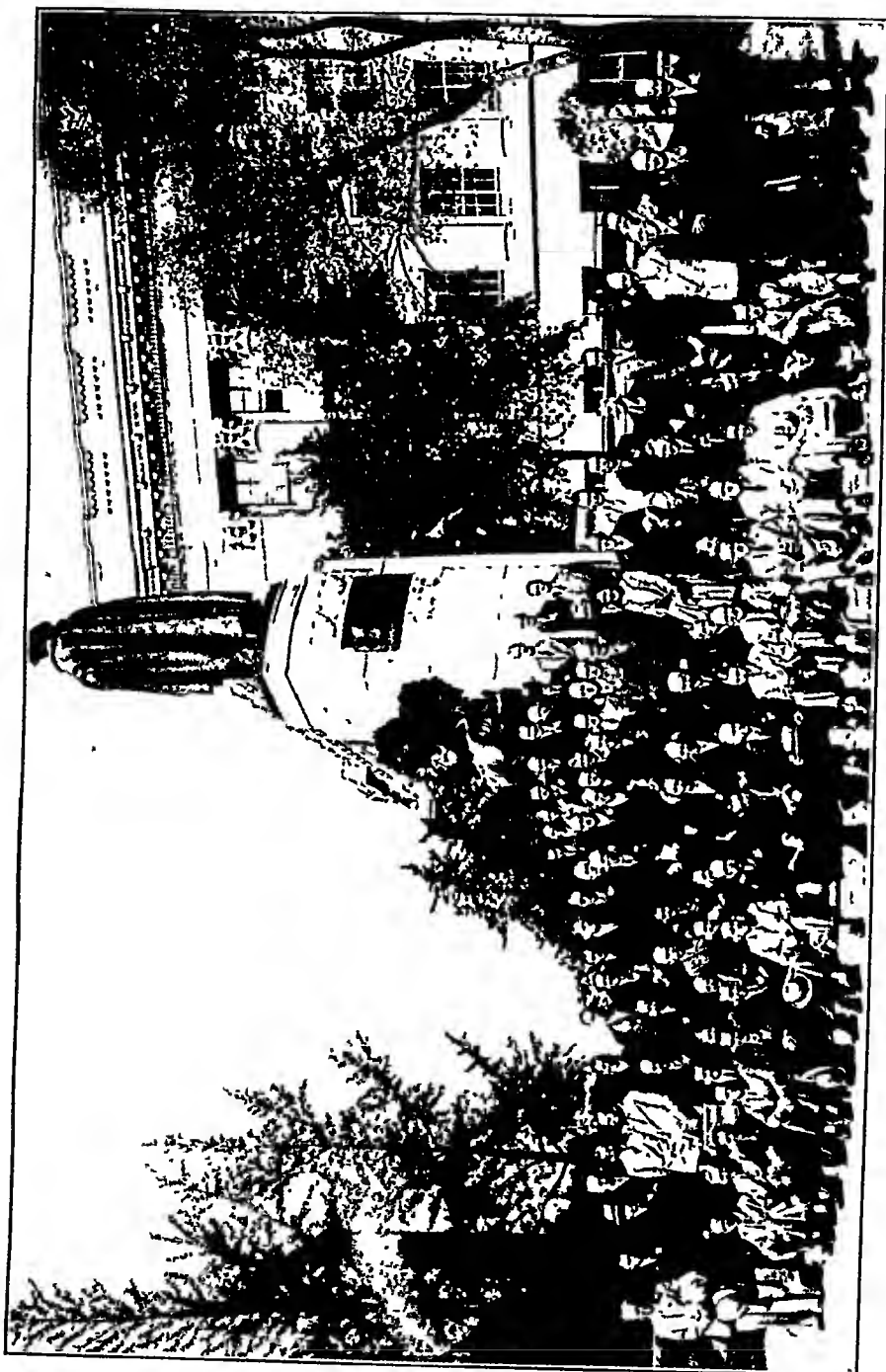
The CHAIRMAN. Any objections or remarks?

(Conclusion No. 9, as amended by the General Reporter, is adopted.)

The CHAIRMAN. The subject assigned to us for this morning seems to have been completed, but we will have to meet for a very brief session at 12 o'clock, in room N for a joint meeting with Section 1.¹

(Adjournment of Second Section.)

¹ See page 65.



GROUP OF OFFICIAL DELEGATES

SECTION 1.—FORENOON SESSION AT 9 A. M., WEDNESDAY,
OCTOBER 8, 1930

SECOND QUESTION.—THE MOST RECENT METHODS ADOPTED FOR THE USE OF
TAR, BITUMEN, AND ASPHALT IN ROAD CONSTRUCTION

FRED R. WHITE, Chairman.
ALBIN L. GEMENY, Secretary.

The CHAIRMAN. The first order of business will be a presentation of the conclusions on the subject of Question No. 2. "The most recent methods adopted for the use of tar, bitumen, and asphalt in road construction." This subject will be presented by Mr. R. W. Crum, Director of the Highway Research Board, National Research Council, Washington, D. C. Mr. Crum.

The GENERAL REPORTER (Mr. Crum). Mr. Chairman and gentlemen of the Congress, in the general report which you have received, the limitations of space made it necessary to mention only the general impressions received from study of the national reports without reference to the individual papers. Since you have read these general impressions, it will not be necessary to read them now. It is also to be regretted that time now does not permit a review of the many significant features of the individual reports. The distinguished engineers who have prepared them are to be congratulated upon the clear picture they have given us of the use of tar, bitumen, and asphalts in road construction in their various countries.

There can be no doubt, after study of these excellent reports, that bituminous materials in combination with mineral aggregates have been used successfully in various parts of the world to improve roads of all types and classes and under all kinds of traffic conditions. However, this does not mean that all of these materials and combinations are suitable for all locations, but rather that in each case there are limiting conditions as respects materials, design, and economy that need to be carefully considered if the best road for each situation is to be selected. The first conclusion offered is in recognition of this situation.

The road-building industry is in need of fundamental knowledge concerning the behavior of these combinations of materials under various conditions of climate, topography, soil, and traffic by which an engineer can design a road that will be adequate, durable, and economical.

At the present time we have a rather voluminous literature descriptive of the great number of combinations that have been tried, so that unless the engineer can find therein an exact duplicate of his conditions, he may be at a loss how to proceed. Therefore his efforts usually lead to the trial of yet other combinations of materials and construction methods.

In order that tests and specifications bearing a distinct relation to road behavior may be formulated, it will be necessary to know more about the essential features that make for success or failure. For instance, in the case of sheet asphalt, design is largely dependent upon durability and stability, both of which are now reasonably well understood. Corresponding knowledge is still largely lacking in the case of other types of bituminous roads. There is, accordingly, great need for thorough research into the characteristics of bituminous materials and their combinations with other materials, into the effects of climate, subsoil, traffic, and so on, and into the elements of cost, so that the reasons for success or failure become apparent and can be applied to new sets of conditions.

The second conclusion offered is a statement of this need.

The third conclusion serves to call attention again to a situation that received consideration at the Fifth Congress and upon which a committee has since been working. In proposing this conclusion I wish particularly to emphasize the need for the promotion of mutual understanding by translation into the various languages of explanations of what is meant by the various names and terms in common use.

To me it seems as important to promote common understanding of each other's writings as to strive for uniform definitions. This conclusion is not offered in criticism of the work of the committee, but rather to put on record the interest of the Sixth Congress in this work.

I will read the conclusions as set forth in the published General Report, following which I will present some changes and additions which have been drafted after a series of conferences with members of various delegations.

Conclusion No. 1.—Tar, bitumen, and asphalt are suitable materials for use in the improvement of all classes of roads, subject to the limitations imposed by the characteristics of the material, the intensity of traffic, and local physical conditions. Certain governing conditions generally recognized are:

(a) The use of the correct grade and amount of bituminous binder for the particular type of work and aggregates to be used is essential.

(b) Provision for prompt maintenance is necessary. In general, successful results are attained when the roads can be kept in good condition at reasonable cost by maintenance of the surface without the need of extensive repairs to the underlying roadway.

(c) Proper proportion, thorough mixing, and thorough compacting are required in construction of premixed types of surfaces.

(d) Especial care is needed in the construction of bituminous macadam, since careless workmanship or improper methods may not be apparent immediately after construction.

(e) Attention should be given to the reduction of slipperiness.

Conclusion No. 2.—The need for research into the fundamental factors involved in the use of tar, bitumen, and asphalt in road improvement and maintenance is recognized. The attention of the members of the Congress is especially directed to needs as follows:

(a) Research into the constitutions and characteristics of bituminous materials, and their combinations with other materials.

(b) Research into factors affecting the serviceability and durability of roads, such as climate, subsoil, traffic density, and road design.

(c) Data on economic factors such as:

(1) Cost of transportation over various road types, including vehicle-operating costs and roadway costs.

(2) Relation between maintenance costs and volume of traffic for various road types.

Conclusion No. 3.—In order that mutual understanding and helpfulness may be promoted, there is need for an international classification of materials, combinations of materials, construction methods, and road types which will correlate the terms in use throughout the world, both commercial and scientific.

As I said, there have been various communications received by your General Reporter suggesting changes and additions to these conclusions. These have been gone over in conference, particularly with the British and French delegations, and have been studied by the German delegation.

The various suggestions appear to be in the interest of making the conclusions of broader scope and more helpful to the road builders, and the General Reporter is in agreement with them.

I will now read these conclusions, as amended, and point out wherein they differ with the published copy which I have just read.

Conclusion No. 1, in the first paragraph.—Tar, bitumen, and asphalt are suitable materials for use in the improvement of all classes of roads, subject to the limitations imposed by the characteristics of the material, the intensity of traffic, and local physical conditions.

It is especially desirable to note the extended use in recent years of superficial coatings, in particular those effected with emulsions.

Then, "certain governing conditions generally recognized are":

(a) is unchanged.

Following (a) a new one is added which did not appear in the printed copy. That will be (b). These, you will remember, are governing conditions in the use of these materials.

(b) Suitable aggregates, correctly graded.

The next one, which is (b) in the printed copy, referring to maintenance, which will be (c) in the list, has been reworded—

(c) Provision for prompt maintenance—

that is, as a governing condition—

when the foundation is adequate and when the surface can be maintained at reasonable cost, an advantage of the types of roads built with these materials is that they can be kept in good condition by maintenance of the surface without the need of extensive repairs to the foundation.

This wording particularly calls attention to an advantage of roads of this type, which I think was covered by the original wording, but by imputation rather than by direct statement.

The next governing condition, (c) in the old copy as printed and (d) in the new list, has been reworded to make it of more general application. The original refers only to premixed types of surfaces. The suggested rewording is as follows:

(d) Proper proportions of the constituent materials, thorough mixing and thorough compacting.

The same statement applies to the next governing condition, (d) in the printed copy, (e) in the new draft. In the original which I read you it referred to bituminous macadam. It is suggested that that also be made of broader application, as follows:

(e) Competent technical supervision of design, construction, and maintenance.

(e), which in the original read: "Attention should be given to the reduction of slipperiness"; it is suggested that this be amplified and made more useful, as follows:

To be (f) in this copy.

Slipperiness.—Attention should be given to the reduction of slipperiness. In some cases valuable results have been obtained by the following methods:

1. Adoption of suitable compositions containing the maximum permissible proportion of large aggregate.
2. The rolling of plain or preconted chippings into newly laid surfaces.
3. The use of minimum practicable camber of surface and proper degree of superelevation on curves.

And 4. Treatment of existing surface with a suitable surface dressing compound, covering with coarse, hard chippings, and rolling.

The General Reporter agrees to the addition by calling attention to these methods that have been used for the reduction of slipperiness, because study of the various national reports indicates that these have been widely used, and are not experimental. Other methods have been used for this purpose which may be suggested by other delegates.

That is all of the change in the first conclusion.

In the second conclusion, the only suggested change is the addition of another clause. This is conclusion 2, relating to research. Following the sentence, "The attention of the members of the Congress is especially directed to needs as follows:" add the ., between

a and *b* in the published report, "Improvement of mechanical equipment for use with these materials, and their combinations with mineral aggregates."

No suggestions have been received as yet for modification of conclusion 3.

Your General Reporter is in agreement with the modifications just read and would recommend, if that is suitable, that these be considered by the convention.

The CHAIRMAN. Gentlemen, you have heard the conclusions as presented by Mr. Crum. Are there any remarks or discussion?

Mr. ERNEST J. ELFORD (England). Mr. Chairman, may I first of all express the appreciation of the British delegation on the very fair manner in which their representations have been received.

The British delegation hopes that an effort shall be made to so formulate the conclusions that they might be of substantial value.

A vast amount of time, labor, and money is expended upon the Congress, and we felt that we should all endeavor to make it as useful as possible. The British delegation really accepted the suggestion of the French delegation in reference to the use of superficial coatings, including emulsions, which has been referred to by the General Reporter.

We are also of opinion that special reference should be made to the importance of the adoption of suitable aggregates properly graded; and that the importance of competent technical supervision of design, construction, and maintenance should be emphasized.

We are of opinion that the subject of slipperiness is of so much importance that it should be more fully dealt with in these conclusions.

In reference to conclusion 2 (*a*) it is assumed that this covers research not only in regard to combinations of the three classes of materials mentioned with other materials but also combinations with each other.

We are of the opinion that there is a large field of research in the latter direction.

I only wish to mention one other point, and that is probably merely editorial. In the first line of conclusion 1 and in the second line of conclusion 2 I note (perhaps the lines are not as I have them before me, because I am not reading from the print, but I think it will be quite clear) the word "bitumen" is used, following the word "tar." The word used in the international definition adopted by the Permanent International Committee is "asphaltic bitumen," not "bitumen," and I suggest that editorial correction should be made before the conclusions are finally submitted to the Congress.

I think probably it would save time and be a convenience if I take this opportunity to propose that the conclusions as amended be adopted.

The CHAIRMAN. Gentlemen, you have heard the proposal of the British delegate. Is there a second?

Prof. E. NEUMANN (Germany). Gentlemen, through the kindness of the General Reporter the German delegation has come into possession of the proposals agreed upon in joint discussions with the English and French delegations. The German delegation has studied these proposals and I have the pleasure to inform you, on behalf of the German delegation, that the German delegation is completely in accord with these proposals. We intended on our part also to make suggestions, but see that the important points have been expressed in the new proposals. I believe it will interest you to hear what the essential points are to which the German delegation would give support.

1. We are glad that the surface treatment has been employed in the general preface as a systematic and economical method and that special emphasis has been given to the use of emulsions. The individual points under No. 1, from (a) to (e), have our consent. We are especially glad that under (f) the measures for preventing slipperiness have been mentioned, they give the means by which slipperiness of bituminous roads can be combated. The four measures mentioned here have also proved successful in German road building, and we therefore are glad that these measures are generally recommended and that the attention of highway engineers is especially directed to these measures. At this point I would like to mention a further measure besides that proposed in No. 2 (b) relative to the use of machines and equipment.

I personally would point to the fact that the use of machines No. 2, for building tar streets, as they, for instance, have been mentioned in the German report, are proven practicable to manufacture.

I had occasion in California to observe the building of pitch streets and to determine that asphalt streets are being built which offer a good surface for traffic.

I come to conclusion 2 and would like to remark that the German delegation is completely in accord with these proposals.

No. 3 also has our full approval, and I would only like to emphasize that the German delegation, and with it the German and certainly also the engineers of the whole world would be glad if the commission which is to bring about a uniform nomenclature in street building, would begin its work very soon and finish it.

With reference to the remarks of the English delegate who spoke previously, I would point to the fact that in the German report

(with reference to the varied use of the word "bitumen") the words "asphalt bitumen" has always been used to avoid a confusion with tar.

Gentlemen, I believe I can recommend for approval the further proposals as submitted to us by the General Reporter.

The CHAIRMAN. The German delegate seconds the motion of the British delegate that the amended conclusions as read by the General Reporter be adopted. Are there any further remarks?

M. JEANNIN (France). Gentlemen, the conclusions of the General Reporter give rise, on the part of the French delegation, to three remarks. We had desired that these conclusions make special mention of the increasing use during recent years of surfaces constructed with bituminous emulsions. Likewise, we have thought that it would be useful to consider methods for reducing the slipperiness of the roadway. We have finally indicated that it would be useful to conduct researches with a view to the improvement of material and equipment. We have noted with pleasure that the conclusions as corrected by our General Reporter have taken into account our propositions. We join, therefore, in supporting the propositions which have been made by the preceding delegations in view of the adoption of these corrected conclusions. I may add that we are also in accord with the German delegation that within a short time the terminology used in these questions should be completely standardized. Now, in this respect advanced work has already been done. M. Lorieux will have an interesting communication to make on this subject.

M. LORIEUX (France). Gentlemen, having been until now detained in the Second Section, I have just been informed that your Section has spoken of the work entrusted by the Congress of Milan to an international committee of the permanent association, of which I have the honor to be the president. I think it is useful to give you a report of the work done by this committee.

I wish first of all to pay a tribute to the devotion and the skill of the members of this committee who, despite their own heavy duties, have been kind enough to occupy themselves with the preparation of the lexicon in several languages, and also of the standardization of the test methods of tar, bitumen, and asphalt.

As regards the lexicon, its preparation is well advanced. I have here a first proof, and I hope that after a final correction, the authorization to print will be given soon.

This lexicon, which is in six languages (English, French, German, Spanish, Italian, and Danish) will be divided into two principal parts:

No. 1. Words which, in the opinion of the committee, have no need of explanation; in such cases there will be found for each of the languages simply the corresponding term.

No. 2. Words which, on the contrary, need a definition in each of the languages. This second part has naturally constituted the most difficult work for our committee. A typographical arrangement which is somewhat new and ingenious will make it easy to consult the lexicon, no matter which language is used.

As regards the unification of test methods on tar, bitumen, asphalt, emulsions, etc., I would remind you that in Bulletin No. 52 of our association (July-August, 1927) there have been published the results of the initial work of our committee. We have been able to make a division of the tests, which appear important to us, into those which seem useful, indispensable, or simply interesting. We have thus divided the problems for each of these materials—tar, bitumen, emulsions—and in a last meeting which took place last June we were able to take another step forward. We reached an agreement upon the methods which we considered should be used by all laboratories without exception for the tests of certain materials, leaving full liberty to each laboratory to proceed with any supplementary tests in addition to those which are considered as standard.

We hope to be able to go further in this work at our next meeting, which will take place next year, and in any case we will publish in an early number of the bulletin the results of the work of the committee last June.

I will not surprise you in saying that the discrimination between methods to use is extremely delicate, that it requires diverse tests and experimental verifications, and that the committee is obliged to take into account the opinion of the most competent technicians and experts, all of which obliges it to make progress with great care. This, then, gentlemen, is a very brief report of the work of your committee. I am entirely at your disposal to furnish you additional information, if you desire; but what I can now tell you is that we will continue the work which has been entrusted to us until it is completed. [Applause.]

Sr. JUAN AGUSTIN VALLE (Argentina). Mr. President and gentlemen, before learning of the amendments presented to this assembly, the delegation from the Argentine Republic wished to have the honor to present to the consideration of its distinguished colleagues a new draft of the conclusions drawn up by the eminent General Reporter, Mr. Crum, in his brilliant statement on the use of tars and asphalts in the construction of highways. In our draft the conclusions of Mr. Crum were followed as closely as possible. Now that

the amendments presented by the French, English, and German delegations have been studied by the Reporter and approved by him, *the Argentine delegation accepts them in general.*

We would like to make, gentlemen, some final observations regarding the investigations of the factors which affect the service and life of the roads, such as climate, subsoil, density of traffic, and contour of the roads; inasmuch as these conditions are common to all classes of pavements the same as the compilation of data on the economic factors, such as transportation on various types of roads, including the costs of using vehicles and the costs traceable to the road. I believe, gentlemen, that this should be the motive of a general declaration. With regard to the third conclusion, the Argentine delegation takes pleasure in presenting it in the following form:

The necessity of arriving at an international agreement regarding an adequate and complete scientific and commercial terminology referring to oils, tar, and asphalts, to aggregates, to various combinations in which the foregoing products enter, to methods of construction, and to various types of surface, is recognized, with a view to obtaining an approved understanding between the experts of all countries in the preparation of constructive specifications on uniform international standards which can easily be adapted to the purpose of studying the requirements of modern traffic and the local characteristics, climatological as well as those referring to the subsoil.

Before closing, the Argentine delegation would be exceedingly pleased to have the delegations of Great Britain, France, or Germany, countries in which the use of oil and tar emulsions is so prevalent, propose certain concrete conclusions regarding this point.

The CHAIRMAN. Gentlemen, the delegation from the Argentine accepts conclusion 1 and conclusion 2, and proposes a revision of conclusion 3.

Are there any further remarks on this subject?

Prof. DIRTM P. KRYNINE (United States). Mr. Chairman, ladies and gentlemen, the information on surface tension, as presented in the Dutch report, is of considerable importance to highway engineers. Professor Nellensteyn's investigation refers to the application of bitumens and asphalts to stony materials.

The speaker wishes to emphasize the importance of developing a well-understood theory of surface tension in the treatment of earth roads, too.

The capillary water enters into soil pores easily, while the penetration of tars and asphalts into clay is more difficult.

According to Mitscherlich, the large dimensions of organic molecules impede such penetration. Neugebohrn, according to Zunker, in Blanck's "Handbuch der Bodenkunde," affirms that the absorption of organic liquids is better accomplished after the complete drying out of the hygroscopic water.^a This may be true in certain labora-

tory conditions where the liquid is allowed to enter the soil slowly. In engineering practice, however, liquids are sprinkled more or less energetically from a distributor, and in the case of a completely dry soil the phenomenon known as "balling up" takes place.

Highway engineers know that a certain degree of moisture is preferable to the complete absence of water in the soil. This is plainly stated in the American report. But the percentage of hygroscopic or capillary moisture which proves to be the most advantageous in given conditions is not known.

The speaker proposes to add at the end of the conclusion 2 (a), the following words—

with proper study of their application in the treatment of earth roads.

The GENERAL REPORTER. The General Reporter is willing to accept this addition.

The CHAIRMAN. Are there any objections on the part of the delegations who have proposed the adoption of the amended conclusions Nos. 1 and 2? [No response.]

The chair hears no objections. Conclusions 1 and 2 are adopted as read and amended by the General Reporter and with the addition suggested by Professor Krynine.

Now for the third conclusion.

The GENERAL REPORTER. The delegate from the Argentine has kindly consented to offer his amendment as an addition to conclusion 3, and not a substitution, and proposes to read it as follows:

An international agreement should be reached in regard to commercial and scientific nomenclature with reference to bitumen, bituminous emulsion, tar, and asphalt methods of construction.

The GENERAL REPORTER. It is my impression from the remarks of M. Lorient that that matter is already in the hands of the International Committee and will be taken care of in the course of time.

I take it this third conclusion or resolution is primarily to reiterate the interest of the International Congresses in the importance of this subject.

Sr. JUAN AGUSTIN VALLE (Argentina). I regret that once again I have to ask for your attention. The interpreter has mistaken my proposal. What the Argentine delegation desires is that the delegations from Great Britain, France, and Germany, countries which have a great deal of experience in the use of emulsions, propose to the assembly some guiding standards concerning the use of those very practical and useful materials.

PROF. E. NEUMANN (Germany). If I have correctly understood the previous speaker, the delegate from Argentina, he desires to hear from the representatives of other states who are present on the subject of the use and success of emulsions.

In the country which I have the honor to represent, Germany, emulsions have been used for five years, and their use has increased each year as they have demonstrated themselves as easy of application and as economical because of the special conditions in Germany as regards traffic, climate, and the roads already built.

The German report, conclusion No. 2, has therefore devoted a special chapter to emulsions, the application of emulsions, because this process is a new one and in the report which we had to make the new methods were to be treated in the first place.

I would therefore like to direct the attention of the gentlemen from Argentina to this report, in German. I would not like to omit, however, to call attention to the fact, which I have also found in other reports, that the emulsions have been used in other countries in like degree. I call attention to the French report and those of England and Denmark, for instance, and other countries not represented at present. After a study of the present reports of all countries I have the impression, however, that emulsions are one of the basic new processes.

It was not the intention of the German delegation to call special attention to this point after reference had already been made to emulsions in the introduction to No. 1. I am glad, however, that because of the remarks of the Argentine representatives the question of emulsions has again been brought up for discussion and if my assumption is correct that in this matter it is essentially a question of getting practical experience in the use of emulsions, the experience of German engineers will gladly be available to those of Argentina.

For six years past we have had in Germany a committee on automobile road building, and in this group a subcommittee on asphalt road construction has given out instructions as to the manner of using bituminous emulsions. We will be glad to make available these suggestions, which are the result of practical experience, to the Argentine representatives.

Sr. JUAN AGUSTIN VALLA (Argentina). I thank the delegate from Germany for his kindness, but I must again declare before the assembly that my ideas have not been interpreted. I know perfectly well the theory and the practice of emulsions, since I am professor in the University of La Plata in the Argentine Republic, but what I wish is that this Congress give its sanction to some conclusion; I again state to some conclusion, and not information referring to a matter which in the past years has been widely disseminated first in Europe and has now also arrived in America. Consequently, gentlemen, I insist that in this assembly some conclusion should be reached in the matter and that it will not suffice to pass it by. We all know

also about cement concrete mixtures and, nevertheless, yesterday some statements were made in this matter in order to establish ideas on the subject. Consequently, gentlemen, I beg to request those delegations which have had greater experience than the delegation from the Argentine Republic, inasmuch as we have completed less than 100 kilometers with emulsion treatments, to put in the form of a definite conclusion the essential standards which should be established for emulsions and their adequate use. Gentlemen, I beg to be excused for again bringing up this subject.

M. JEANNIN (France). The French delegation wishes to reply to the question of the Argentine delegate. We believe that it is inadvisable to modify the conclusion of the General Reporter and to insert a special paragraph giving the general characteristics of the use of bituminous emulsions. The use of this material, in fact, depends upon a series of conditions which may vary from one country to another. It seems, therefore, that the general instructions would be very vague and would be of no use to any single country.

Mr. ERNEST J. ELFORM (England). On behalf of the British delegation I associate myself with the remarks made by the last speaker. We consider that we have not yet reached the stage when we can usefully lay down definite conclusions in connection with emulsions. This subject is being studied by a committee in Great Britain which is endeavoring to draw up standard specifications for emulsions and standard tests. The work of that committee has advanced to a very useful point but is not yet complete, so that we regret that we are not at the moment in a position to acquiesce in the suggestion made by the delegate from Argentina.

Prof. E. NEUMANN (Germany). The German road builders have also turned over to a committee, including representatives of the Federal ministry, the question of determining how far our methods for emulsions can be made to conform to the specifications for quality already established. This work, however, has not yet been successful to the point that the German delegation would be in a position to make special recommendations here, in the sense in which they are probably desired by the representative of Argentina. Perhaps he will give us an opportunity to treat this question more in detail at the next Congress. At present we move to let matters stand with the conclusions which the Chairman has submitted to you to-day.

Sr. JUAN AGUSTIN VALLE (Argentina). In view of the statements made by the delegations of France, Great Britain, and Germany the Argentine delegation accepts the explanations given, and in view of the fact that present experience will not permit the formulation of a statement by this Congress it likewise accepts the suggestion

presented by my distinguished colleague from Germany in the sense that emulsions should be a special subject for the coming Congress. Thank you.

The CHAIRMAN. The delegation from Argentina withdraws its suggestion for a conclusion or resolution on the matter of the use of emulsions and suggests that this matter be a subject for the next Congress.

Are there any further discussions on the motion to adopt the conclusion No. 3 as proposed by the General Reporter? [No response.]

The conclusions are adopted.

The CHAIRMAN. The chair desires at this time to express his personal appreciation of the courtesy and patience of the delegates of the various countries represented here through this meeting. [Applause.]

(Adjournment of Section 1.)

SECTION 2.—FORENOON SESSION AT 9 A. M., WEDNESDAY,
OCTOBER 8, 1930

FIFTH QUESTION.—HIGHWAY TRANSPORT.—CORRELATION AND COORDINATION
WITH OTHER METHODS OF TRANSPORTATION; ADAPTATION TO COLLECTIVE
ORGANIZATIONS AND INDIVIDUAL USES

A. J. BROSEAU, Chairman.

H. H. KELLY, Secretary.

The CHAIRMAN. We will proceed to the work planned for the day, which is the consideration of the fifth question, "Highway Transport," presented by Dr. Henry R. Trumbower, the General Reporter. I understand that Doctor Trumbower has conclusions that were considered yesterday by several of the delegations and that he will present them to you this morning, after which there will be discussion.

The GENERAL REPORTER (Doctor Trumbower). (Reading the prepared proposed conclusions:)

1. Highway transportation has in the last decade become firmly established in the general scheme of transportation in the important and progressive countries of the world. The people and government agencies of the several countries are beginning to investigate the possibilities of coordination in the movement of persons and commodities by highway on the one hand and by rail, water, and air on the other.

2. The coordination of rail and highway transportation is the more pressing problem.

3. The development of highway transportation through the use of the motor vehicle has not been of equal intensity in all countries. To the degree that this development has gone on in a country to that extent has the problem of the coordination and correlation of highway and rail transportation facilities become the more pressing in its demand for a solution based upon broad economic and scientific principles, so that the public as a whole may enjoy the maximum benefits of all its transportation agencies.

4. Transportation by highway and transportation by rail are partly complementary and partly distinct services. Each one must be judged on its own merits. The considerations which govern the one are not the same as the considerations which govern the other. One can not be placed in a subordinate position as compared with the other.

5. In considering this problem of coordination, it must be recognized that common carriers of both passengers and freight constitute but a very small part of the total highway traffic. In general, private automobiles form the most important part of highway traffic, but it is they which compete most seriously with the railways in passenger traffic. Where such a condition occurs, public authorities should permit the railways to adjust their train schedules so as to reduce passenger train-miles as much as possible. Railroads find it advantageous to substitute for unprofitable trains buses owned by them or operated by one of their affiliated companies.

6. The operation of all public motor omnibus services, irrespective of ownership, must be subject to adequate control by a responsible authority embracing a wide area so as to insure regularity, efficiency, and adequacy of service, safety of the public at large, and avoidance of excessive competition and uneconomic fares.

7. In certain situations it is found that the small amount of traffic that highway common carriers might draw from the railways is largely compensated by the feeder service which they afford to main lines of railroads. This is especially true in mountainous countries where railway construction is extremely expensive. There the automobile, by superseding the old and slow means of transport, has brought about a revolution in traffic and has caused such regions to be better developed industrially and commercially.

8. In considering the various proposals for a closer coordination between rail and highway carriers, one of the following three plans is usually followed:

(a) Voluntary cooperation between railroad companies on the one hand, and operators of buses and common-carrier trucks on the other.

(b) Inauguration of highway services by the railroad companies, or obtaining financial control by the railroads of highway carriers.

(c) Quasi-legal coordination with obligation placed on the different transport companies to agree to the creation of a system of cooperative operation and in case agreement is not reached the enforcement of compulsory coordination by governmental authority.

9. Automobile and bus operation, as well as motor-truck operation, produces new traffic, part of which the railroads could not handle; the passenger traffic created being both short and long haul, but the motor-truck traffic being in general short haul. It must be observed, trucks operating over good highways act as agencies for gathering freight which serve to increase the productivity of the farming areas and relieve the railways of short-haul freight upon which little or no profit could be made.

10. Common-carrier truck operations, as a whole, have not been profitable, due to the competition of private and contract trucks. Common carriers of freight on the highways handle such a small part of the total traffic that the field does not appear sufficiently attractive for railways as a general proposition.

11. Traffic surveys, including studies of origin and destination of traffic, are of special value in revealing the true characteristics of various kinds of motor traffic and their relationship to other forms of transportation, whether as feeders thereto or supplementary thereof.

12. Highway transportation enterprises should be financially self-sustaining. Monetary subsidies on the part of the state or of private interests, should arise only in the opening up of certain regions or sections of country which are destitute of traffic. Otherwise, the motor vehicle should be in position to bear its own expenses and taxes in so far as they may be considered fair to the motor vehicle. This is true in particular with reference to the contribution for the maintenance of roads which the motor vehicle makes by the payment of motor-vehicle taxes.

13. Taxes for highway purposes should be borne not only by motor vehicles, but by all interests which benefit from the highway system, and should not be such as would arbitrarily prohibit the use of highways.

14. Cooperation between railroads and automobiles, which has already been effected to some extent, is one of the great requirements of the age. In seeking such solutions, the needs of aviation by the provision of aerodromes and roads leading to them must not be overlooked.

15. It is desirable for the convenience of the travelling public that there should be standard rates (with the minimum of exceptions) for new time

schedules in public-road services, and that there should be universal as well as regional roadway time tables. [Applause.]

The CHAIRMAN. We will now proceed to the consideration of the conclusions, paragraph by paragraph. The chair will recognize speakers to item 1.

Ing. FERUCCIO VEZZANTI (Italy). Mr. Chairman, I would propose to our General Reporter, Doctor Trumbower, to add a sentence to paragraph No. 1. This sentence should read as follows:

The coordination between different systems of transportation, by land, by water, and by air, should be so arranged that every transport should be done, as far as possible, through the most economical way and that most fitted to the particular needs. In this matter the public authority should adopt such legal and fiscal relations as to not disturb the natural economic conditions of each transportation system.

The GENERAL REPORTER. The suggestion appears to me to be well taken, and, so far as I can see, will generally improve the conclusion as read.

I make a motion to adopt the paragraph 1 of the report as read by me, with the addition suggested by the gentleman from Italy.

The CHAIRMAN. You have heard the motion. It has been seconded. [Duly seconded.] [No opposition.]

The conclusion is adopted unanimously.

We will now proceed with the conclusion, item 2.

The GENERAL REPORTER. Item 2 reads as follows: "The coordination of rail and highway transportation is the more pressing problem."

The CHAIRMAN. Is there any discussion on item 2? [No response.] [Adopted.]

The General Reporter reads item 3.

The CHAIRMAN. Is there any objection? [None.] Item 3 is adopted.

The General Reporter reads item No. 4.

The CHAIRMAN. Does any one present wish to make any criticism or addition? [No response.] [Adopted.]

The General Reporter reads item No. 5.

Ing. F. VEZZANTI (Italy). Mr. Chairman and gentlemen, I would propose to our General Reporter to make just a little addition to the last portion of item 5. This amendment should be as follows:

Railroads find it advantageous to substitute for unprofitable trains busses operated by them or by others.

The reason for the amendment is this—that we have in Italy some that are substitutes not by the railways themselves but by other operations which the survey of the Government—

The GENERAL REPORTER. Such an amendment I shall gladly accept.

The CHAIRMAN. You have heard the corrected report.

If there are no other suggestions, we will put the question, as amended. [No response.] [Adopted.]

The General Reporter reads item No. 7.

The CHAIRMAN. Any discussion with respect to item 7? [No response.] [Adopted.]

The GENERAL REPORTER (after reading item No. 8). I want to make a correction in the first sentence of item 8. Two words were dropped out in redrafting these resolutions.

In considering the various proposals for a closer coordination between rail and highway carriers, one of the following three plans * * *.

I suggest introducing the words "or more" after "one."

Mr. E. S. SURAPHIEL-SMITH (England). I support the Reporter in adding the two words "or more" to the governing three lines.

I desire to amend (b) of the three alternative methods for securing coordination. In line 2, after the two words "companies or," I wish the clause to read as follows: "Financial and administrative control or participation exercised by these companies in the conduct of road transport undertaking."

Speaking for England, and it may apply to other countries, there are real objections, supported by the railway companies themselves, to inure upon the railway the obligations to perfect themselves. It has been found by all the great English railways, with the consent of the leading motor-bus companies and of the government departments concerned (I feel entitled to add) that instead of financial control a very satisfactory method of coordination has been for the railway to purchase one-third of the established road transport undertaking, the principal holder of those companies retains one-third, and the general small shareholder up and down the country to have the other third.

Again, in administration the railways in Britain do not exercise control nor at present, at any rate, do they desire it. Joint committees have been set up between the officers of the old road transport companies and the railway companies as regards administration and are working exceedingly well.

I submit to the conference that it can not be its desire to force control alone when the alternative of participation equally achieves the object in view. I also think, Mr. Chairman, it would make it clearer if in line 1 of (b) we inserted the word "transport" between the two words "highway" and "services."

The GENERAL REPORTER. Therefore part (b) of section 8, as amended, would read as follows:

Inauguration of highway transport services by the railroad companies or financial and administrative control or participation exercised by these companies in the conduct of highway transport undertakings.

I shall gladly accept the proposed change as an amendment.

The CHAIRMAN. Is there any further discussion with respect to the recommendation of the Reporter as to section 8? [No response.] [Adopted.]

The CHAIRMAN. We will now proceed with item 9.

The General Reporter reads item 9.

Mr. S. A. VASSILIEV (United States). I would like to make an amendment after the first sentence, so as to make more clear what we are talking about. In order to help, it should say that less-than-carload freight when produced by new methods of containers, helps to solve the problem between the people. I just raise the question of containers, which was mentioned in the report of the French delegation. It is a very interesting one and I hope that the next Congress held in Germany, will pay more attention to this new method of coordination between railroads and bus companies. Also the problem of freight between different terminals is a question that applies to all railroads and applies to all people who are in charge of handling the transportation by truck.

The GENERAL REPORTER. The first sentence of section 9 would read as follows after this amendment that is being considered:

Automobile and bus operation, as well as motor truck operation, produces new traffic, part of which the railroads could not handle.

Now here comes the addition:

* * * and is enormously helpful in shipments of less-than-carload freight by introducing new methods of containers and helping to solve the problem between terminals in large cities.

I do not see any objection at all to adding that to it, because it is one of the outstanding problems, and I gladly accept the amendment.

The CHAIRMAN. Is there any further discussion of the Reporter's recommendation or the suggested addition?

Mr. Vassiliev has very generously suggested that perhaps the text in slightly different form than read might be necessary, and we will accept his suggestion and so word it as to express his thought.

If there is no further discussion, I will put the question.

All in favor will signify by saying "aye." [Ayes.] Contrary, "no." [None.] The "ayes" have it, unanimously.

We will proceed with item 10. Is there any discussion in respect to item 10? [No response.]

If not, I will proceed to put the question. All in favor signify by saying "aye." [Ayes.] Contrary, "no." [None.] The "ayes" have it, unanimously.

Item 11. Any discussion with respect to that?

If there is no discussion, I will put the question. All in favor will signify by saying "aye." [Ayes.] Contrary, "no." [None.] The "ayes" have it, unanimously.

Ing. F. VEZZANI (Italy). Mr. Chairman and gentlemen, I would also propose this little addition to No. 12, in the last sentence. The addition to read, as changed: "This is true in particular with reference to the contribution for the maintenance of roads which the motor vehicle makes by the payment of motor vehicle taxes." I should add "including gasoline taxes or duties," because this gasoline tax is perhaps the most important part of the money which Italy has to collect.

The GENERAL REPORTER. I will be glad to accept that amendment.

The CHAIRMAN. The Reporter announces his willingness to accept both amendments suggested.

Are there any further criticisms or suggestions with respect to that item as amended? [No response.] [Adopted.]

The General Reporter reads item No. 13, item No. 14, and item No. 15. They are adopted without any discussion.

The CHAIRMAN. Now, gentlemen, we have considered the conclusions presented for your consideration and approval by the General Reporter, and each of the items as amended has been approved.

It is now in order to move the approval of the conclusions as a whole.

M. L. DELEMER (France). Gentlemen, the French delegation requests that there be added to the 15 conclusions which have just been adopted the following:

16. The Congress, considering that the question relative to the coordination of the various methods of transportation has received formal consideration at the International Congress of Railroads held in Madrid, May 5 to 15, 1930, under the title "Competition Between Automobile Transportation Systems and Railroads";

Not being able to proceed to the thorough study required by an examination of the conclusions of the Madrid Congress;

Resolves, That hereafter the question of establishing coordination and harmony between the various systems of transportation by road, by rail, by waterways, and in the air, be considered by the various International Congresses that may be called upon to deal with it, and that reports be prepared by joint commissions of the accredited representatives of these various systems of transportation.

It is difficult for us to ignore that the International Railway Congress of Madrid has published extremely complete and interesting conclusions upon the very question that we are here studying. I realize that we can not pronounce our views to-day upon these different conclusions, but it would appear to me indispensable that in the future an effective contact be made, before the Congress, between the various organizations of transport and administrations to prepare in common the study of these questions.

The GENERAL REPORTER. The proposed addition made by the delegate from France has received our very serious consideration, and I think there is a great deal of merit in what he has just said.

My suggestion in this matter is that action be taken first upon the 15 sections which were incorporated in the general report, and that Monsieur Delemer's proposal be acted upon separately.

Mr. EDWARD J. MEHREN (United States). I rise to support the proposal of the General Reporter.

The CHAIRMAN. It has been moved and seconded that the conclusions of the General Reporter be approved as a whole as approved in sections as amended. If there is no further discussion, I will put the motion. [No response.] [Adopted.]

I will now ask if the delegates present wish to discuss further the remarks made by Monsieur Delemer (France)?

Mr. EDWARD J. MEHREN. The delegation from the United States feels that the stand of our French colleague is well taken, that this Congress should show cognizance of the work of the well-known Congress at Madrid. It believes with him, however, that sufficient time has not been accorded to us to make an adequate study of these resolutions, and it therefore supports his resolution, that the Permanent Commission of the International Road Congress should be requested to appoint a joint commission representative of the various agencies of transport to study this matter.

Mr. E. S. SHAPPELL-SMITH (England). Mr. Chairman and gentlemen, the matter of the Madrid Railway Congress resolution has occupied the attention of the British delegation at several meetings. I desire to thank the French delegation for drawing our attention further to this matter, and on behalf of the British delegation I think the best course has been found in the motion before us, that the Permanent International Commission should be apprised of the fact that we are cognizant of the Madrid resolution and desire them to take initiative action for the setting up of a sensible, competent commission to deal with these matters which have arisen too late for this Congress.

I therefore support the motion which Mr. Mehren seconded.

Herr WALTER ERTING (Germany). At the request of the German delegation I can state our satisfaction at the fact that through the kindness of a few members of the English delegation last night we acquired possession of the new proposals as well as conclusions to Question 5, and awaited the opportunity to busy ourselves with this new general report at to-day's session.

In general we can agree heartily with it. We are also completely in accord with the treatment of the additional French proposals here.

I would like to tell you with what great interest we have followed the statements made in the American and English report regarding passenger auto and truck traffic. I believe this kind of traffic statistics ought to be a model for the other nations. The careful preparation by the president and the secretaries has materially added to the prompt and satisfactory disposal of the conclusions.

The CHAIRMAN. Is there any further discussion with respect to the resolution presented by M. Delemer, of France, and seconded by Mr. Mehren, of the United States, and Mr. Smith, of the English delegation? [No response.] [Adopted.]

The CHAIRMAN. Gentlemen, that concludes the consideration of the general report and there is no further business before the meeting. I thank you.

Adjournment of the session of Section 2.

FIRST SECTION.—FORENOON SESSION AT 9 A. M., THURSDAY,
OCTOBER 9, 1930

THIRD QUESTION.—THE CONSTRUCTION OF ROADS IN NEW COUNTRIES SUCH
AS COLONIES AND UNDEVELOPED REGIONS

GROVER C. DILLMAN, Chairman.

ALBIN L. GEMENY, Secretary.

The CHAIRMAN. The Third Question for this Section will be handled by the General Reporter, Mr. E. W. James, chief of the division of highway transport of the United States Bureau of Public Roads.

The GENERAL REPORTER (Mr. James). Mr. Chairman, gentlemen of the Congress, before proceeding with my report I wish to call your attention to the fact that on page 6 of to-day's Bulletin you will find in English only a copy of the proposed conclusions on Question 3. It is unfortunate that this material could not have been prepared sufficiently in advance for us to publish in the Bulletin copies in the other languages, but in the exceeding great pressure of business in connection with the Congress, we were really fortunate in securing publication in English.

I call your attention to these conclusions, because they in fact constitute a part of the report and are an addition to the printed report you all received.

(The General Reporter reads the printed report and the following proposed conclusions:)

PROPOSED CONCLUSIONS

1. It is desirable, in the first place, to form a central body with legal authority to coordinate and assist the general planning of the road communications of a country and the acquisition or reservation of necessary land.

2. The perfection which has been attained in the building of automotive vehicles often permits highways to render service in the exploration and development of new territories which formerly could be rendered only by railways.

3. The highway has the advantage over the railway of allowing the expense of construction and maintenance to be made proportionate to the importance of the traffic to be served. The present-day automobile being able to run on very difficult roads, at the beginning we can establish simple trails, by nothing more than a primitive working over of the natural soil, the structures which are necessary being only those over permanent water courses which can not be forded. The road will ultimately be improved by the construction of a roadway provided with an appropriate surfacing, and the construction of structures for crossing streams and valleys in proportion as the development of traffic makes available new resources for the execution of the work.

4. Adequate land should be acquired to provide for the eventual and ultimate expansion of the traffic as far as can be foreseen.

5. Before any actual construction is begun, it is essential that the general highway layout should be prepared with due regard to the ultimate requirements of the permanent road system.

6. Every endeavor should be made to insure that the initial alignment, grading, and subsequent surfacing should be such that all work executed should be capable of being utilized in the ultimate development of the road structure.

7. In the first instance, the actual traveled way should be so constructed as to be passable for motor traffic, but as economically as possible.

8. Locations in cuts should be avoided when they have disadvantages from the point of view of drainage, and light fills are to be preferred.

9. Where traffic is light in numbers and unit weight, earth roads have proved economical and satisfactory, but to conserve the surface of such roads until they can be improved it is essential to restrict the weight per unit width of tire and speeds of individual vehicles to such an extent as may be necessary to prevent undue erosion or disintegration of the road surface.

10. For the establishment of roadways a width of 3 meters per traffic lane should be required. On structures a width of 3 meters (10 feet) or even multiples of 3 meters should be reserved for traffic. It is recommended that from the beginning 2-lane roadways be provided on important structures at least in so far as the foundations are concerned.

11. Uniformity of design throughout the length of a location should be attained by avoiding heavy grades and sharp curves in stretches of road which in general do not contain them.

12. Some tests of mechanical grading of the roads have been made in desert regions; it is desirable that these tests be continued.

13. It is desirable also that systematic research be undertaken to determine the physical properties of mixtures of clays and sands which constitute the natural soils, including soils containing hygroscopic salts, with a view to collecting useful data for the construction of earth wearing surfaces, appropriate for economic service in little-developed regions having available few resources.

The CHAIRMAN. Gentlemen, you have listened to Mr. James in his discussion of the subject, and he has outlined to you 13 conclusions that have been drawn and presented fully on the subject. These conclusions are now open for discussion by this meeting.

M. VICATRE (Algeria). The French delegation has not been able, in a single reading of the English text of the proposed conclusions, to ascertain exactly whether or not the conclusions differ upon some points from those which we suggested to the General Reporter. We must, therefore, make certain reservations, but we think, nevertheless, that these divergencies, if any exist, are probably not very important and that the work of editing may be done without difficulty through an agreement between the General Reporter and the individual reporters. The French delegation, therefore, does not oppose a vote upon the conclusions.

Mr. S. H. WARREN (England). The British delegation felt that the original report as made by the General Reporter, while giving a

perfectly fair and balanced statement on the main points made in the various reports, was not sufficiently definite and direct to be a real help and guidance to those engineers whose work lies in creating highway systems in new countries.

They therefore put forward certain proposals, a large part of which the General Reporter has accepted with broadmindedness and vision, and has incorporated in the conclusions you have just heard.

On behalf of the British delegation, therefore, I beg to suggest that the conclusions as given by the General Reporter should be agreed to.

Dr. JOSEPH BRIX (Germany). In the praiseworthy general report of Mr. James it is stated that there are still considerable differences of opinion as to whether streets are to be built with two lanes or with one lane and turnouts. Furthermore, there are differences of opinion as regards the formation of curves and the maximum permissible grades.

It was therefore difficult for the General Reporter to prepare definite conclusions in time. At any rate, as one of the German workers on this third question, I would like to submit recommendations regarding individual points on behalf of my German friends.

Because of the shortness of time I can omit detailed proof before this expert audience, composed of the chosen representatives of all the countries of the world.

We now recommend, if at all possible, for the time being to build the roads in a manner suitable for two traffic lanes. A lane width of 9 to 10 feet or 2.75 to 3 meters each is to be preferred. There are no objections to building bridges with only one lane for the time being.

Wherever, in sparsely settled and for the time being less productive countries, because of economic reasons, one has to be satisfied with 1-lane roads, it is recommended to consider whether for certain distances or lengths of roadway, lanes are to be built sloping to one side for the purpose of making it easier in building the second lane sloping to the other side.

Roadways on curves are to be made of greater width and sloping to one side. This requirement is to be taken into consideration, especially on turnouts and at curves on roads of only one lane. Long tangents are, of course, to be preferred. Radii of curves below 100 meters should not be used. Where shorter radii are necessary, in mountainous countries, they should not be less than 10 to 15 meters (30 to 45 feet) and the curves should be proportionately widened. Longitudinal grades greater than 8 to 10 per cent as a maximum are undesirable. These grades ought to be reduced as much as possible on curves.

Finally there is pointed out the possibility of making artificial fords at river crossings, so as to be able to omit the building of expensive bridges, as I have described more in detail in my first report. In subsequent bridge construction above the ford pavement the bridge piers are thereby protected from underwashing.

The German delegation in general agrees with the principles of the General Reporter last stated; also with the motion of the English delegation. At any rate, I would be glad if, before the next Congress, uniform consistent principles for the building of roads in colonies and other developing countries might be set up by the qualified delegates of the countries.

Sr. VALLE (Argentina). Before presenting to you, in the name of Argentina, various conclusions concerning the construction of highways in new countries, I must state that quite recently, since arriving here, I have become acquainted with the valuable findings of the General Reporter, Mr. James. The somewhat original title of this third subject under discussion has called forth a large collection of data dealing with many aspects of road construction, such as technical, financial, and administrative, and overstepping the bounds of the subject matter to which this substantially technical section should devote its attention—namely, the construction and maintenance of highways. In my opinion, this subject matter should have been entitled "Low-cost highways" or "Improved earth roads," and this would have served to limit the information and debate contained in the various essays offered by the delegations.

The delegation of which I am chairman acts in accord with the conclusions approved at the Second Pan American Highway Congress held in Rio de Janeiro last year. These agreements, furthermore, coincide exactly with the ideas of the North American experts as shown in the careful study of the General Reporter, Mr. James. My delegation believes on this important phase of highway construction, so vital to Argentina, that low-cost surfacing—in other words, roads with primary improvements—are the type of roads which should be built in those regions far removed from the centers of population and of industry, in which latter sections naturally the higher-type roads are necessary and already being built.

If it is true that highway construction did not concern the new nations, in the first throes of evolution, until the arrival of automotive vehicles (the railroad had already supplanted the rudimentary and unsafe wagon trails, and accomplished a tremendously important and civilizing work) it is equally true that to-day these new nations are no longer standing still in this respect; and I can assure you that, in so far as it concerns Latin America, and especially Argentina, very earnest work is being put forth to improve our highway system, because we are convinced, gentlemen, of the all-

important influence of the highway on the development of all productive forces, bringing about and augmenting the general well-being of the peoples.

Accordingly, gentlemen, in order to bring about the real and positive benefits of an all-weather system of highways, which has for its main object the cheapening of the cost of travel and of transportation, I believe it would be advisable for this assembly, because of its great prestige, to approve in their entirety these conclusions. I shall omit reading them because from No. 4 to No. 13 they practically coincide with those of the Reporter and I do not wish to bore the delegates. By approving these conclusions I believe that this Congress would assume the important rôle of guidance and direction, since in many countries we still find a great prejudice against the improved earth road, and in these countries no work at all is done until there is enough money to spend on hard pavements.

For this reason, gentlemen, the Argentine delegation has given its preferred attention to this subject, because in our country there are vast expanses of sand-clay and clay lands, and our experts have to work out the problem of constructing a permanent all-weather system of highways, but at low cost.

A country with only 12,000,000 inhabitants can not undertake the construction of arterial hard-surface highways in the regions removed from the centers of population and industry, but it can build them near the large cities such as Buenos Aires, Rosario, Cordoba, Mendoza, La Plata, Santa Fe, where the highways and roads should be as good as they are in this great and prosperous country. What I am asking of the delegates, then, is the permission to turn over to the General Reporter the conclusions arrived at by our delegation, with the object of changing, not so much the spirit as the letter of the agreements and conclusions from No. 4 to the end. With respect to conclusion No. 3, although it is true enough, I do not see the need for making comparisons or establishing connection with the railroads. I think that it is best in all these congresses for us to treat with the subject matter which concerns us instead of dealing with other matters which should be left to other assemblies, thus avoiding also the imposition of pet ideas.

The CHAIRMAN. Do I understand that the gentleman representing the Argentine delegation agrees to the spirit of the 13 conclusions drawn by the General Reporter and that it is only a matter of wording?

[Expression of assent from the Argentine delegation.]

Mr. C. L. Cox (British West Africa). Mr. Chairman and gentlemen, I should like to suggest a slight modification of the second sentence in conclusion 10. That sentence suggests a proposal that a

width of 3 meters (10 feet) or even multiples of 3 meters should be reserved for traffic on structures. Speaking from experience in the premier British Crown Colony, and of more recent experience in Nigeria, a British tropical colony, I have no hesitation in saying that 3 meters is an inadequate width for a single-lane bridge, and that its multiples are barely sufficient, in my opinion, for a bridge to accommodate two or more lanes. Drivers of vehicles in our tropical dependencies are not so reliable or so clever as the drivers that we meet in this country and in other parts of the world. And we have found from bitter experience that a width of 3 meters (10 feet) is insufficient to provide for the safety of the traffic and for the safety of the structure itself.

I would suggest the consideration that that conclusion be amended by altering the width of 3 meters for a single-lane structure to $3\frac{1}{2}$, or personally I should prefer 4.

I would be prepared to accept for a double-lane structure, or structures of more than two lanes, multiples of 3 meters, although even there I suggest that the provision is not too generous.

The GENERAL REPORTER. With respect to the remarks of the previous speaker, I wish to point out that the wording of the conclusion has been rather carefully made in contemplation of the requirements of bridge design. It says, "On structures a width of 3 meters or even multiples of 3 meters should be reserved for traffic." Now, that doesn't say that the width of those structures shall be 3 or 6 or 9 meters.

In the United States, where we are building a bridge in a 2-lane road which should be ordinarily 20 feet wide, we will build that bridge with a clear width between trusses of 22 feet. Naturally that is not done with the expectation that we are going to get 22 feet for traffic in the sense that that is the actual width of roadway, but in order to allow room for felloe guards and to provide for the protection of the trusses, we must make that allowance, and I think the wording of the conclusion as it stands is sufficiently broad to provide for those conditions of design which would actually give you the necessary clearance either of width or height if you have a through truss.

The CHAIRMAN. Does the explanation given by the General Reporter cover the ground, I will ask Mr. Cox?

[Expressions of assent.]

Mr. DIMITRI P. KRYNINE (United States). I do not propose any amendment to the conclusions.

The principal difference between a system of roads in an old country and that of an undeveloped region or colony consists in the following: In the former case the road system must be adapted to the

needs of the existing industries; and in the latter, the roads represent one of the means to control the economical development of a certain region.

Some ideas representing raw material for future consideration are as follows:

First, a thorough economic study of a given, undeveloped locality should precede any technical road survey.

Second, a plan of road construction for a number of years should be prepared, on the basis of the following data:

(a) Actual economic value and actual intensity of traffic.

(b) Eventual (may be estimated) economic value, and eventual intensity of traffic.

(c) Funds available for the work.

Third, a strict coordination of work between highways, railroads, waterways, and airways should be assured.

Fourth, the type of each element of the road system should be chosen to meet the actual requirement of the traffic. The eventual modification of the type must be foreseen.

Fifth, the proper research on local conditions in different undeveloped countries, such as climate, geological structures, soils, and subsoils, should be started as soon as possible by the particular interested countries or regions.

It seems to the speaker that only on the basis of accurate data, furnished by such a research, can existent European and American standards and methods be successfully applied in undeveloped countries.

Mr. MALCOLM ELLIOTT (Alaska). The construction of roads in new and undeveloped countries involves a number of conditions and problems which do not apply, or apply only in a limited way, to ordinary road construction. Some of these special conditions and problems have been referred to in the various reports, but it would perhaps be well that they be summarized in the consideration of the principles which should generally govern the layout of road systems in such countries, and the conduct of the work.

The particular conditions which may tend to differentiate road layout and construction in undeveloped countries from similar work in developed countries, and the effect of such conditions on general policies, seem to be as follows:

The population is usually small and unable to finance a road system that will provide for all of its needs. Assistance from the parent government may be essential in order to stimulate growth and development.

Communities in undeveloped countries are often separated from their base of supply and from each other by long distances, and their

development is retarded by the consequent high cost of importing supplies. New roads are generally needed to relieve this situation.

Railroads are either nonexistent or reach only a small proportion of the area of the country. Hence, greater reliance must be placed on roads for long-distance transportation than is the case in settled countries.

Traffic to be immediately expected over new roads will be much smaller than in settled countries. Less durable types of construction are therefore permissible than in regions where a large traffic must be provided for immediately.

Contractors having the necessary capital, plant, and experience for efficient road work can not always be found in new or undeveloped countries. Hence the government road-building organizations may frequently have to perform the actual work.

The demands for roads are often very large in proportion to the amount of funds available. In such cases, if the entire country is to be benefited, the adoption of high standards of construction throughout is impracticable.

It may often be desirable that construction and improvement of any project shall be programmed so that the entire route will benefit by each year's expenditures instead of bringing the road up to final standard section by section. For example, it may often be better to improve a pack trail to low-standard automobile construction and then improve the road to final standard as the next step, rather than improve each section in turn to final standard.

Traffic over roads during construction must generally be provided for because in unsettled countries there are rarely sufficient side roads to serve as detours. The assistance of road-building crews and their equipment is often needed in order to keep traffic moving over rough or soft places. The annoyance and hindrance to road building that this occasions must often be endured if the main objective of the work, namely, the development of the country, is not to be ignored.

Particular attention must be given in sparsely settled countries to coordination of the road system with other means of transportation. While in well-developed countries practically all railroads and waterways may be paralleled by automobile roads, in undeveloped countries first attention should be given to localities not served by railroads or waterways.

Roads should generally connect outlying areas with the railroads and waterways, and thus act as feeders. Duplication of facilities by connecting two or more places already on the main axis of transportation, should be deferred until the less-favored localities have been served.

The foregoing conditions apply to Alaska, which is a Territory very large in area and as yet greatly underdeveloped. Its area is 590,000 square miles; roughly one-fifth of the United States.

Thousands of square miles within the Territory can not be reached by automobile or wagons, and are accessible only by use of pack animals, by foot trails, or by airplane. A systematic program for development of the Territory by means of roads is in progress, but from a variety of causes must proceed slowly.

An important road now in use in Alaska is the Richardson Highway, which, beginning at Valdez on the southern coast of the Territory, extends northerly to Fairbanks, which is the main town in the highly mineralized section of interior Alaska. The total length of this road, including a branch at the southern end, is 463 miles.

Work on this road was commenced in 1905. It was not built to any definite specifications, but each year sufficient work was done to improve conditions over the entire route.

The early appropriations were small, and to have built immediately any section of the road to a reasonably high standard would have exhausted the funds without accomplishing any general improvement. Accordingly, work was first concentrated at the principal obstacles, and then applied to the gradual improvement of the entire road.

Under this policy the road became passable for dog teams in 1909, for light horse-drawn wagons in 1911, and for light automobiles in 1913. Since that time, progressive improvements have been made until now the road has attained a good, gravel-surface standard, and automobiles can travel over it at average speeds of over 25 miles per hour.

The road crosses two mountain ranges at elevations of about 3,000 feet above sea level. The total cost of construction was \$2,732,000, an average cost of about \$6,000 per mile.

During the progress of the work on Richardson Highway, it became evident that an extension of 161 miles would be needed to connect Fairbanks with navigation on the Yukon River. This extension was built under substantially the same policy.

The construction and maintenance of roads in the Far North involve special problems. In Alaska the subsoil is permanently frozen to bed rock. The covering of the ground is generally a thick moss which insulates the ground beneath the surface. The surface, however, thaws during each summer, and this produces a continuous surplus of water during the thawing season. The moss and grass form small pools, retarding the run-off of this water, with the result

that in summer the ground is very swampy and soft, even on the hillsides.

This condition, together with the frozen ground just underneath the moss cover, adds to the difficulty of road building. The wet soil interferes with the operation of road-building machinery, and the ice or frozen ground just beneath the wet cover impedes grading operations.

The best procedure in such cases is to commence operations by stripping the moss from the roadway, and constructing ditches to drain it and intercepting ditches to collect and dispose of the water from the up-hill side of the roadway.

The GENERAL REPORTER. After communication with Señor Valle of Argentina, I am prepared, subject to an appropriate motion, I assume, to accept as an amendment of conclusion No. 6, the following material which is to be prefixed to the present No. 6, so that it will read as follows:

6. In countries of low density of population, and where the construction of a large mileage of roads adequate even for light traffic is limited by the scarcity of available funds, it is deemed advisable to adopt the progressive system of construction by stages. Every endeavor should be made to insure that the initial alignment, grading, and subsequent surfacing should be such that all work executed should be capable of being utilized in the ultimate development of the road structure.

Sr. VALLE (Argentina). The Argentine delegation is completely in accord with the proposed conclusion, No. 6, read by the General Reporter.

Ing. JUAN I. MOLFINO (Uruguay). The delegation from Uruguay accepts in general terms the conclusions offered by the General Reporter, but also seconds the conclusion presented by the Argentine delegation concerning the convenience of the system of improvement, progressive or by steps, in the construction of economic roads. The conclusion presented by the Argentine delegation, I suggest, might be included among conclusions 5 and 6 presented by the General Reporter.

The CHAIRMAN. Is there a second to that motion? [Duly seconded.]

It is moved and seconded that No. 6 be amended by the prefix read by the General Reporter. Are there any objections? [None.] It is so carried.

Mr. WILLIAM LIVINGSTON (Bermuda). I wish briefly to draw the attention of this Congress to one feature of this subject of roads in undeveloped countries that has not been referred to, and that is the influence of the improvement of the outboard motor on small motor transport in such countries. I refer as an instance to roads in river

valleys, in forest-covered countries such as the Guianas and Brazil, where road construction through such forest-covered countries is very expensive. I know of cases where, within the last five years, the traffic, which was very light and traveling over considerable distances, as a result of the improvement of the old system of motor transport, has been taken back from the road onto the river by the use of the outboard motor, with the result that the road, which was at one time the communication, or rather the improved communication, because originally the traffic was on the river and then was put onto the road, has now returned its traffic to the river.

I would suggest that the General Reporter, dealing with this subject, consider something on the following lines:

In view of the improvement of the outboard motor, and increased use of small boats for transport in forest-covered countries where road construction is comparatively expensive, care should be taken to ascertain in cases where a few years ago the road was the correct development whether the light traffic to be provided for should not be taken care of by light river transport facilities.

Mr. K. G. MITCHELL (India). The delegation from India find themselves in some difficulty. Coming from a country with an area equal to that of Europe without Russia and a population of one-fifth of the populated world, and being employed in the development of our roads, we might be expected to take a considerable part in suggesting certain matters to this Congress.

Our difficulty is that, while we are in agreement with a considerable number of the conclusions which have been put before you, there are others with which we can not agree. We do not think that the conditions of India, however, are sufficiently common to justify us in endeavoring to modify the conclusions which have been placed before you.

Over 90 per cent of the population of India lives outside the towns. Seventy per cent of that population is employed in agriculture. The whole country, with the exception of a few desert areas being improved by canal irrigation, is definitely settled.

The question of primary road construction, therefore, is one upon which, as such, we can offer no very definite opinion. Therefore, we propose merely to put on record in the discussion certain modifications of your conclusions which our experience suggests we should draw your attention to:

In conclusion 1, the word "body" in the first line suggests to us some statutory body outside the government of the country in which these powers are vested. That, we understand, is not the intention of the framers, and lest others fall into the error into which we fell when we saw it, we suggest that the word "body" be replaced by

"authority"; with the consequent alteration in the second line by eliminating "authority" and writing "power."

The CHAIRMAN. This is only a matter of wording.

Mr. K. G. MITCHELL. We should add to conclusion 3:

It is suggested that at the beginning it will suffice to establish trails by little more than a primitive working of the soil.

We would like to suggest to you that that conclusion does not sufficiently emphasize the fact that in a large majority of cases in tropical and semitropical areas the drainage of that trail is of great importance.

The GENERAL REPORTER. I think that it is better to keep the wording which I have proposed.

Mr. K. G. MITCHELL. With regard to conclusion 10, this Congress has just now adopted an amendment which recommends construction by stages. If you start with an earth road and gradually raise its standard, and if your original layout is based on the earth road, the question of vehicular lanes must be treated with great caution. Our experience is that the chief object to be aimed at in an earth road is to make it as wide as you possibly can, so as to distribute the work.

Further, in India and possibly in other countries, the traffic is so mixed with droves of sheep and cattle, camels, bullock carts, horse-drawn vehicles of various descriptions, and every variety of light motor vehicle, that in those conditions vehicular-lane design, in our opinion, does not apply. I would add that our experience is that—limited as we are by cost, and subject to the proviso that, where we can afford it and where special traffic conditions require it, we increase width on bridges of small span—we make our arterial road bridges with an 18-foot free passage, and our secondary road bridges with 12 feet. That, we find, provides for reasonable facility of movement of the very mixed traffic which we have on our roads.

M. VICARI (Algeria). In my first remarks I indicated that in my opinion the conclusions proposed by the General Reporter would give satisfaction to the French delegation providing simple modifications of editing were made. But after having listened to the preceding speakers who have gone further into details, I think that it would be interesting to mention two slight modifications to conclusion 4 and conclusion 13.

In conclusion 4, the English text speaks of acquiring land in view of a future extension of traffic. This is a somewhat vague formula and the French delegation, in the proposed conclusions which it had prepared, had thought of stating the matter more precisely. We had indicated that it would be useful to hold land for widening up

to 30 or 40 meters. This figure of 30 meters is found in several individual reports and, if I am not deceived, in the report of the United States. Would the General Reporter find no difficulty in thus completing conclusion No. 4?

As regards conclusion No. 13, would it not be also interesting to study the influence which the addition of hydrocarbons, that is bitumen, tar or asphalt, may have upon these mixtures?

Mr. W. J. KERR (India). Mr. Chairman and gentlemen, with regards to the last speaker, I have only one small remark to make. In the country where I have to work, many of our roads are on very high embankments owing to the conditions due to excessive rainfall. It is therefore absolutely impossible for us to lay down any definite widths for the general acquisition of land, this being fixed by the height of our road embankment.

I would therefore suggest that the conclusion No. 4 as worded by the General Reporter may be allowed to stand.

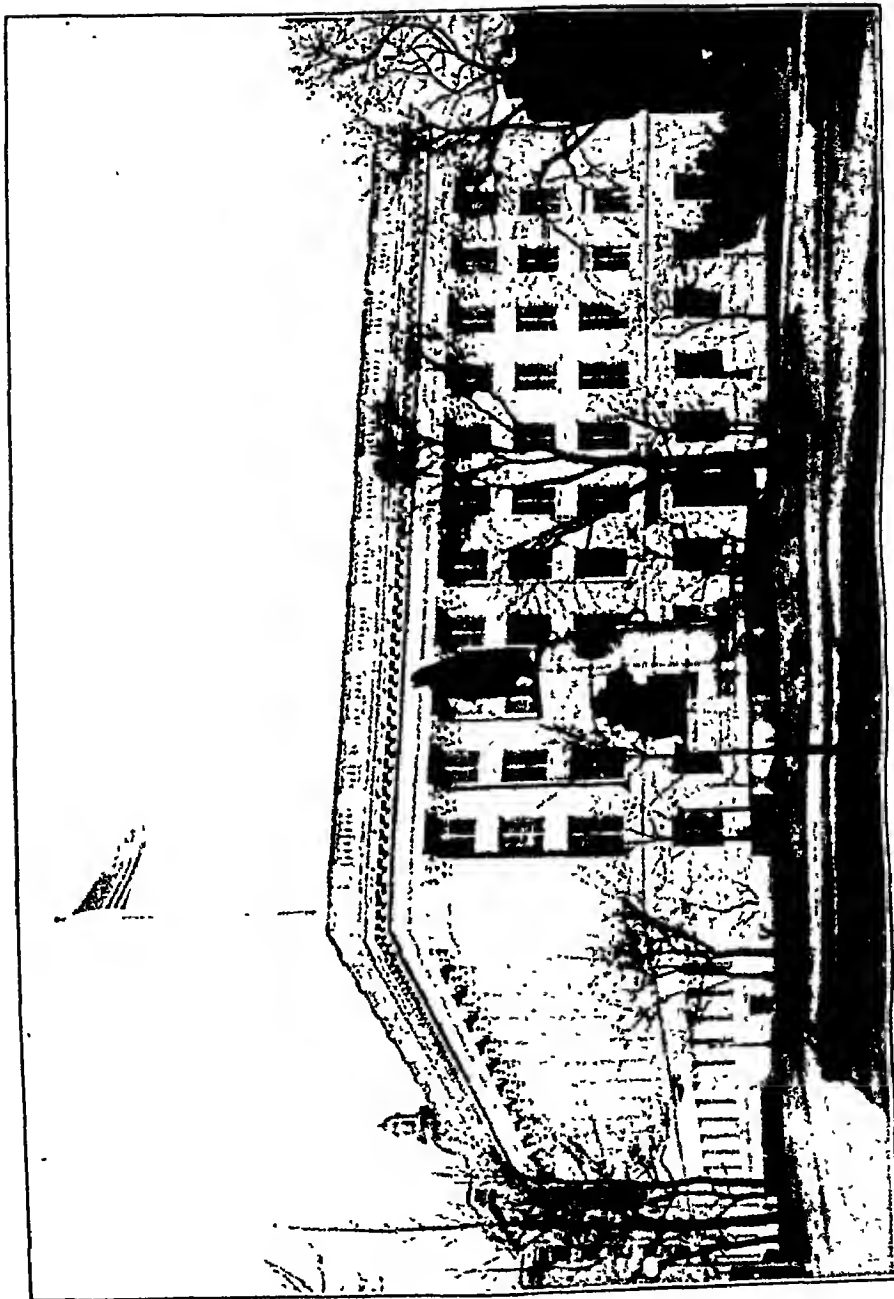
The GENERAL REPORTER. I support what has just been said by Mr. Kerr. As for mentioning the bitumen, tars, and asphalts in connection with conclusion No. 13, I do not oppose it, but I do not see that it has any great interest.

M. VICAIRE. I do not insist.

Mr. SAMUEL ECKELS (United States). Mr. Chairman, the United States delegation desires to offer a resolution at this time, that the 12 conclusions as drawn by the General Reporter (other than conclusion No. 6, already carried) be adopted by this Congress.

The CHAIRMAN. You have heard the motion by Mr. Eckels of the United States delegation. Is there a second? [Duly seconded.] Are there any objections? [None.] The conclusions are carried.

The SECRETARY. The American Organizing Commission of the Congress is very anxious to present in the Official Bulletin on Friday morning the correct text of the conclusions agreed upon for all questions, and especially on the third question. In order to assure the accuracy and purity of the language in which these conclusions will be expressed, it is requested that the Reporters on each Question from France, Germany, and Spain, or the secretaries of these delegations, assemble in room D at 2 o'clock this afternoon to prepare in the respective languages the correct text of the conclusions. (Adjournment of the First Section.)



BUILDING OF THE CHAMBER OF COMMERCE OF THE UNITED STATES
HEADQUARTERS FOR THE CONGRESS

SECTION 2.—FORENOON SESSION THURSDAY, OCTOBER 9, 1930

SIXTH QUESTION.—(1) TRAFFIC REGULATION IN LARGE CITIES AND THEIR SUBURBS; TRAFFIC SIGNALS; DESIGN AND LAYOUT OF ROADS AND ADAPTATION TO TRAFFIC REQUIREMENTS IN BUILT-UP AREAS. (2) PARKING AND GARAGING OF VEHICLES

C. M. BABCOCK, Chairman.

H. H. KELLY, Secretary.

The CHAIRMAN. Gentlemen of the Congress, we have up for consideration this morning Question No. 6. This question has been divided into two sections: First, traffic regulation in large cities and their suburbs; traffic signals; design and layout of road, and adaptation to traffic requirements in built-up areas. Second, parking and garaging of vehicles.

I will ask the General Reporter, Dr. Miller McClintock, to read his report.

The GENERAL REPORTER. Mr. Chairman and members of the Congress, before I begin the reading of my formal report I wish to take this opportunity to express my appreciation of the great privilege which I have enjoyed as General Reporter on this question of reading the many fine and constructive papers on this subject which have been submitted by the various countries. It is a regret to me that the shortness of this report makes it impossible to make due and proper recognition of the contribution contained in each one of these splendid papers.

I will now proceed to the reading of the printed report on the Sixth Question. (The General Reporter reads his printed report.)

I believe this formal printed report to be an accurate digest and indication of the tendency on this subject as revealed by the various reports. In order that these tendencies may be more accurately defined and fixed and in order that the Congress may have before it a specific set of conclusions for appropriate action, I have taken the liberty of preparing a set of such formal conclusions. These are printed on mimeographed sheets, which have been handed to you as you entered the section this morning.

Thus, I now introduce as a formal part of my General Report the conclusions which I will now read.

Conclusion No. 1.—The Congress confirms in general the conclusions of the Congress of Milan on the Fifth Question relating to the layout of cities with regard to convenience and safety of traffic.

Conclusion No. 2.—With respect to traffic signs and signals the Congress urges the necessity for uniformity and adherence to the principle that shape and color shall be utilized to give indications.

(a) The Congress recognizes the recommendations of the diplomatic conference held in Paris in 1926 and set out in Bulletin No 57, May-June, 1928, as an important step toward this end, and it proposes that countries that have not accepted these recommendations should in designing systems of signs give due consideration to the principles contained in that bulletin. And the Congress further proposes that an international committee be named by the Permanent Commission and the Executive Bureau of the Permanent International Association of Road Congresses to consider methods for the universal application of the principles contained therein.

(b) It is further recommended that the same international committee undertake to propose uniform standards for traffic control signals and other control devices. Pending the establishment of such standards, it is recommended that the color red in traffic control signals be used only for the purpose of stopping traffic.

Conclusion No. 3.—The Congress recognizes that the design of rules and regulations for the facilitation of traffic in congested districts is a problem of growing complexity and that control measures should be applied only after a competent study of local conditions by qualified officials. Under suitable conditions the following types of regulations have been found useful:

(a) Parking restrictions through the application of time limits and prohibitions.

(b) Segregation of types of traffic through the exclusion of certain classes of vehicles.

(c) The regular alignment of vehicles through the use of traffic lane markings.

(d) One-way movement.

(e) Rotary traffic at intersections where center islands of sufficient size and adequate visibility to permit easy rotation can be reserved.

(f) Control of turning movements at intersections and of U turns between intersections.

(g) Pedestrian regulation.

Conclusion No. 4.—The Congress recognizes the physical and financial difficulties involved in replanning congested and built-up districts in large cities. It believes, however, that substantial relief can be obtained through changes looking toward the adaptation of streets in such districts to the requirements of modern traffic. Among such adjustments are the following:

(a), Where economically possible, public rail carriers should be removed from the street surface in such districts and placed in subways, or rapid transit, or forms of transportation offering a minimum obstruction to traffic should be substituted, thus providing improved transportation and an increase in general traffic capacity.

(b) The passage of pedestrians across heavily traveled streets can be facilitated and protected through the construction of subways at street intersections or other natural places of crossing. In certain districts it may be desirable that such subways be sufficiently close together so that any crossing of the street surface by pedestrians will be rendered unnecessary.

(c) In order that prohibition of parking may be applied without undue public inconvenience, encouragement should be given to the provision of off-street storage space economically and conveniently available. The Congress holds that in certain cases it may be proper to require in the construction or remodeling of buildings the incorporation of suitable space for the off-street loading and garaging of vehicles.

(d) The Congress holds that traffic congestion and the resultant economic losses are sufficiently great in certain instances to warrant consideration of expenditures for the construction of grade separation at intersections, and indeed for the construction of elevated or underground streets.

Conclusion No. 5.—As regards sections of the city in process of development, and suburban zones destined for future development, the Congress urges the application of broadly conceived plans for their layout, in order that the future may not result in a repetition of the difficulties now experienced in congested districts.

The CHAIRMAN. Now under the policy that has been set up at the previous sessions, we will take up each conclusion separately and begin with conclusion No. 1.

The GENERAL REPORTER. Under conclusion No. 1:

The Congress confirms in general the conclusions of the Congress of Milan on the Fifth Question relating to the layout of cities with regard to convenience and safety of traffic.

The CHAIRMAN. Is there any discussion on conclusion 1? [No response.] [Adopted.]

The CHAIRMAN. We take conclusion No. 2.

The GENERAL REPORTER. May I call your attention to the fact that there is a covering clause at the beginning of this conclusion which controls the two paragraphs (a) and (b)?

(The General Reporter read the covering clause, and in addition the first matter for action; that contained in paragraph (a)).

Sr. BORDA (Argentina). I represent in this assembly the Argentine Touring Club, the Argentine Federation of Highway Education, and the South American Touring Federation. I regret exceedingly that for reasons that it is not necessary to explain, the institutions that I represent did not have ready on time the documents and proceedings which they had planned for the Congress. In the matter of highway traffic regulation, now being discussed, which is without doubt of capital importance, the institutions which I represent have placed in my hands a valuable work which may serve you as a valuable precedent. We recognize fully the eminent attainments of the men who initiated and are directing these matters in the international congresses. I need not refer to the previous studies you have been discussing. I am only going to mention the resolution passed by the second Pan American Highway Congress which met in Rio de Janeiro, which was as follows:

The second Pan American Highway Congress, in view of the fact that the international system of road signals does not meet the requirements of modern traffic, recommends that the Pan American Union, in cooperation with the different countries members thereof and with other bodies duly constituted, make a study of the various systems of road signals indicating caution and direction used at present, and that it work out a project for a uniform international code; that such signs be prepared for adoption by the member nations of the Pan American Union, and be presented to the Sixth International Highways Congress which will meet in Washington in 1930.

The signs adopted up to the present moment are established, and that which indicates a bad road is a wavy silhouette, dangerous curves a zigzag silhouette, cross roads a silhouette of a cross, railways without safeguards a locomotive silhouette, guarded rail crossings a silhouette of a fence. The sixth signal is lacking, that is, a sign indicating "Go slow," because of the existence of danger of some other kind; hence the interested industries should propose to the Congress a sixth sign which might be of any kind whatsoever, but which should be of such a nature as to warn any man from any part of the world instantaneously of "Danger!" and to that end our institutions have proposed a sign which may be this one [exhibiting a drawing] or some other. I do not wish to take more time and I merely beg that in view of the reasons which I have previously given that this exposition be accepted as a contribution to the subject and nothing more.

The GENERAL REPORTER. It would appear to the members of the Congress that the proposal which has just been made was a very strong argument for the conclusion which is set forth in paragraph (a) of conclusion No. 2, which is now before you for consideration. Unfortunately, various countries and different parts of the world, without due coordination and cooperation with one another, have

adopted systems of road signs which differ materially one from another. Assuredly, the time has now come when the volume of this international travel is such that we must obtain, so far as is possible and practicable, a high degree of uniformity in our sign systems in order that a traveler from any country in the world, no matter where he may find himself, will obtain quickly and without confusion the necessary information to avoid dangers and confusion upon the highways.

Thus I believe that this report has confirmed the sense of the conclusion as set forth in the printed report, and that through the cooperation of the delegates to an international committee from South America, from North America, from the various European countries it will be possible on the basis of the principle of carrying indications by means of color and shape to design a universal and uniform sign system, perhaps not in each country exactly like the signs that are used in other countries but in principle and in essence sufficiently uniform so that all may be universally understood.

Dr. CARL O. FRITSCH (Germany). I find that the proposal of the General Reporter is very good. Nevertheless, I would like to inquire of the assembly if it is necessary to establish a new committee to open anew a discussion of the application of principles agreed upon in Paris in 1926.

The resolutions which were made at the Paris conference seem to me so clear and simple that I fear that a newly created international committee could contribute very little.

I would therefore like to propose that we next find out what countries have not yet followed these directions and at to-day's meeting of the Congress ask them to comply with these directions, and temporarily waive the appointment of a new committee.

The GENERAL REPORTER. The purpose of incorporating paragraph *a* in conclusion 2 was not for the purpose of designing a new code of signs to supplant those set forth as the result of the diplomatic conference in Paris in 1926. It was rather suggested as a practical way of getting together for purposes of cooperation the administrative officials of the countries representing various parts of the world, in order that the principles set forth in that convention could be made more directly applicable and useful. In other words, it seemed that there would be little utility in this Congress merely affirming the code as set forth in Bulletin 57 of the Association of Road Congresses, the belief being that such an affirmation formally made would have little or no effect in the actual propagation of the generally accepted principles which are set forth in that code.

I again call your attention to the situation mentioned by the delegate from the Argentine, and also your attention to the situation

which is represented in the United States to-day, where millions of dollars have been expended upon a formally organized and adopted set of road signs.

It is improbable that a mere formal gesture on the part of this Congress, affirming the Paris convention, would have any administrative effect in bringing about a modification of the procedure which is being conducted in Argentina, in the United States, or in other countries that have already adopted signal sign codes. It is felt, however, that if an international committee, under the sponsorship of this Congress, could bring together the administrative officials of these various countries which have not yet accepted the principles of the Paris convention, it would then be possible to work out a means whereby the principles of that convention could be made useful and applicable in modification and development in the sign systems that are now progressing so rapidly in these various countries which have not yet accepted the system.

I wish to make it clear that the proposal for this committee and the exact wording as set forth in the conclusion does not contemplate the setting up of a new sign code, but rather to afford a mechanism for the actual practical promulgation of those principles in the development of a universal sign system.

Sig. ARTURO MERCANTI (Italy). In the name of the Italian delegation and above all in the name of the users of roads in Italy who now possess automobiles in considerable number, I should like to make note of the statement that the committee whose creation is suggested, does not propose to modify the decisions of the 1926 International Conference of Paris. At Paris, in fact, discussion was confined to the question of highway danger signals, in adopting the triangular shape, and these signals were limited to well-defined categories, curves, railroad crossings, cross roads. Now in Europe this system of signalization has been applied almost everywhere and the governments on the one hand and the automobile associations which are joined in the International Association of Recognized Automobile Clubs on the other, have established upon the European highways these signals which it would now be very difficult to change. I should state that this system of danger signals is the result of studies which have been in progress since the development of automobile tourist traffic began.

Now, the thing upon which I insist, gentlemen, is that the one action of this International Road Congress at Washington should not change these resolutions, but as our eminent General Reporter has said, that they should encourage the use of these safety signals which have been established by the Convention of Paris.

I wish to direct the attention of the Congress to a fact which is common to all roads, whether in the old world or the new world; that is, that many differences exist in direction signs. There are certain countries which employ one geometric form, others which employ another. There are important differences in the colors. I should much like to see the Congress assign also to this committee which it will name, the work of regulating the uniformity of direction signs. Finally, there is a last question which is very important for road users, and above all for motorists; the question of highway advertising. Advertising enterprises now have the habit of attracting the attention of road users by making use for their panels of the triangular or other shapes employed for the official signals. Above all it is necessary to avoid absolutely the possibility of having upon our roads advertising signs which may be confused with the danger signs, for it is inadmissible that confusion which may imperil the security of the highway should be created for commercial purposes.

Herr EBERHARD VON SCHENCK (Germany). It is not always easy to take a position immediately on resolutions presented at the beginning of a meeting. We are therefore very grateful to the Reporter for the explanation which he gave with the proposal, from which we understand that it is not intended to discuss the Paris resolutions or to revise them.

The work of the committee, which is to be appointed here, should deal with assisting in the further execution of the Paris resolutions and the expansion of the work begun in Paris on points which have not yet been taken up for unified regulations.

With this proviso, the German delegation withdraws its objections to the establishment of the proposed standing committee, and Germany will be pleased to assist in this work. We realize that there are a large number of difficulties to be overcome in order to succeed in a unification of traffic signals.

The committee will have to approach its work with much foresight and consideration. It must keep in mind that such a unification can only be the result of a general development which takes into consideration what has already been accomplished in individual countries, the experiences of various countries in recent years, and also the scientific investigations that have been carried on regarding this subject in Germany and in other countries.

We believe that in this way the committee can perform very useful work in the service of the unification of international traffic signals.

M. E. Loharux (France). Gentlemen, I simply want to support, in the name of the French delegation, the ideas which have just been expressed by our colleagues of the Italian and Germany delegations.

We believe that the work of the International Conference held at Paris in 1926 should be considered as final, because it would be truly inadvisable, considering the work of preparation which has just been mentioned and the application already made at great expense in a great number of countries, to take up the conclusions of this conference again. I find that our General Reporter has had an excellent idea in proposing that an international committee named by our Executive Commission should continue the complex study of signalization in view of further uniformity, which is necessary for the ease and safety of traffic in all countries of the world.

I join the suggestion of our Italian colleague regarding measures which should be taken in all countries to prohibit the use of advertising signs along the roads which may not only confuse the users of the highways but which generally do not contribute to the embellishment of our scenery. Consequently, I suggest that you simply vote for the conclusions 2 (a) which have been proposed by our General Reporter and which entirely answers these requirements.

THE CHAIRMAN. Is there any further discussion at this time on paragraph (a) of conclusion No. 2? [No response.] Adopted.

We will now consider paragraph (b) of conclusion 2.

The General Reporter reads paragraph (b).

THE GENERAL REPORTER. I think at this point that I should perhaps offer some brief explanation.

Paragraph (a), which you have just approved, refers only to what are known to the United States as "signs," or those devices to which I believe you commonly refer in Europe as nonilluminated signals. In other words, such devices as those signs along the highways indicating the approach to a curve, to a railway crossing, to a dangerous intersection, or such signs in cities as refer to the prohibition or limitation of parking.

The word "signal" or the expression "traffic control signal" as used in paragraph (b) refers to a different class of devices. They are those devices which you commonly call "illuminated signals" or "illuminated signs," or sometimes referred to as semaphores. In other words, paragraph (b) refers exclusively to traffic devices designed and used for the purpose of starting and stopping traffic.

I ask you to bear that in mind in considering this paragraph, because it refers only to "stop" and "go" signals.

It was the hope that it might be possible to avoid undue complication in the organization of the Permanent International Road Congress by combining the consideration of such "stop" and "go" signals with the considerations recommended in paragraph (a) above. It was also felt that one committee should consider both of these subjects in addition, because they are so closely interrelated.

With this explanation, I leave the conclusion for your consideration.

Mr. ERNEST PAUL WRETLIND (Sweden). The General Reporter has already explained the meaning of the wording of paragraph (b). However, the Swedish delegation would suggest an amendment to the last sentence, by addition of the following wording:

For other traffic signals, the color red may still be used for caution as well.

The GENERAL REPORTER. It was not with the intention of precluding the use of the color red in devices other than "stop" and "go" signals that this conclusion was drafted as it is presented in the typed report; but in order that there may be no possible misunderstanding that the restriction of the use of the color red in "stop" and "go" signals for the purpose of indicating "stop" precludes the use of the color red in other traffic devices, such, for example, as those marking obstructions in the highways. I think that this amendment was highly desirable and acceptable.

And so for your consideration I will read the last sentence of paragraph (b) as amended:

Pending the establishment of such standards, it is recommended that the color red in traffic-control signals be used only for the purpose of stopping traffic; for other traffic signs, the color red may still be used for caution as well.

Colonel BARBER (United States). My belief is that it is desirable to avoid the prohibition of such use of red as in the case of lanterns, red lanterns hung to mark an obstruction in the highway, or perhaps the red tail light of the automobile.

If I have understood correctly the purpose of the amendment, I believe it would be accomplished perhaps more perfectly by substituting for the word "sign," some other expression. For this, I would suggest the following:

For other traffic indications, such as those marking obstructions in the roadway, the color red may still be used to indicate caution.

I would like to be sure that this meets the point of view of the Swedish delegate, who raised the question originally. [Assent.]

Doctor DICKINSON (United States). The term "caution" has commonly been used in a different sense than the term "danger," and I simply want to raise the question whether the proposed change would not be more acceptable with the elimination of the last three words—namely, the elimination of the term "caution"—that is, stating that red may be used for the marking of obstructions and such other indications.

The GENERAL REPORTER. Colonel Barber's wording, being very specific and accurate and in agreement with the proposal of the Swedish delegate, is entirely acceptable to the General Reporter.

The CHAIRMAN. Are you ready for the question? All those in favor of this amendment will signify by saying aye. [Ayes.] Contrary, no. [None.] The amendment is carried.

The CHAIRMAN. We will go on with conclusion No. 3 at this time.

The GENERAL REPORTER. Because of the character of the third conclusion, which in its subparagraphs is merely an advisory list of useful methods of traffic regulation, it would seem unnecessary to read each one of these conclusions separately and to act upon each separately. I will, therefore, read the entire conclusion 3. (The General Reporter reads conclusion 3.)

Dr. WERNER FRILCHENRIL (Germany). As a representative of the commercial automobile owners I would like to direct your attention to the first sentence of this third resolution. The first sentence requires a detailed study by qualified officials when changes of traffic regulations are made.

I hope that in the words "local conditions" is included a timely and sufficient hearing of the representatives of the trade interests.

If traffic on these streets has become so dense that a change becomes necessary, this is caused because the business activity has become so intense in these streets. The density of traffic is a result of the magnitude of the business interests which are at stake. I would, therefore, like to point this out and assume that the Reporter has interpreted this sentence in such a way that not only traffic police and traffic regulations, but also the business interests which are at stake, are properly considered.

The hearing of trade bodies is an essential prerequisite in every country. *Each traffic regulation must, however, in the interest of traffic, be elastic and permit of changes.*

The damage to interested capital in the business sections by changes of a street from second to first grade is enormous. I hope, therefore, that I can assume that the emphasis of this first sentence does not rest on the fact as to who makes this investigation but on the words, "a competent study of local conditions."

I have no proposal to make regarding this and hope that the sentence of the reporter will be so interpreted.

I feel obliged to say these words in the interest of the trade bodies only because in all of these automobile congresses I continually find that representatives of the governments, of the State officials, and of the automobile clubs are present and make decisions, but that the representatives of the automobile trade are either not present at all or only in a hopeless minority.

In view of the understanding which this Congress has so far brought to trade questions in automobile traffic there is no special motion necessary, but perhaps you will agree with me that it was not out of the way to direct your attention to it.

The GENERAL REPORTER. I appreciate very deeply the contribution made by the last speaker in interpreting the provision of this first paragraph of conclusion 3, and his interpretation is strictly in accord with the intent of the phrases here used.

In the fourth line I call your attention to these expressions, "only after a competent study of local conditions." It would be quite inconceivable, in my experience which is limited primarily to American cities, to designate any traffic study looking toward the formulation of regulations as competent unless it included consideration of the economic consequences of those regulations and the effect of any possible regulation upon the business related to that traffic.

If, therefore, we consider the expression "competent study of local conditions" in its broadest sense, which is certainly the one implied. I believe that the intention of the distinguished delegate from Germany is adequately cared for.

If, on the other hand, he desires to insert some expression which would make particular reference to such phases of the competent study as business conditions, it would certainly be quite in harmony with the intention of the conclusion.

Permit me to go one step further and direct your attention to the words at the end of the same line, "by qualified officials." This paragraph is a recognition and, I believe, the first recognition on the part of an eminent international group that the control and regulation of traffic in our great cities is no longer a proper exercise for amateurs; that it has reached the point where it is proper to call it a professional technical activity.

And this phrase at the beginning of conclusion 3 emphasizes the necessity for cities, in the organization of their administrative machinery dealing with traffic matters, not to permit regulations to be made in a casual way by unqualified persons, by amateurs, if you please, by the mere representation of unqualified groups whose aims are frequently not for the benefit of the general public and often unfortunately have in mind some selfish accomplishment which they desire to gain through their presentation.

Thus, in brief, the conclusion says that traffic control is a matter of important technical consequence; that rules and regulations should not be made casually, but should be made by qualified officials only after they have taken into consideration all of the local conditions.

If that explanation and interpretation of the phrases as here used meets the objection of the German delegate, I am happy. If they do not, however, then such phrases as may be necessary should be incorporated into this section.

Mr. EDWARD J. MEHREN (United States). It seems to me that Doctor Feilehenfeld's point is very well taken. I think also that the General Reporter's explanation is of great help. But we must bear in mind that this document will go forth widely into quarters unaccompanied by such verbal explanation as the doctor has made.

It seems to me, therefore, that a proper qualifying phrase, or rather a proper phrase amplifying the doctor's explanation or putting it into words, rather, in the document, would be desirable. I say that with a great deal of confidence, because in the National Conference on Street and Highway Safety, held in the United States in May, it was there concluded by the traffic engineers of the United States that the best results in traffic regulations and control were obtained when there were associated in the study not only the qualified public officials but representatives of the interests affected as well.

For these reasons I would propose for the consideration of the Reporter the addition of the following words at the end of line 4: "and the cooperation of the interests affected." The line would then read:

Only after a competent study of local conditions by qualified officials and the cooperation of the interests affected.

That fulfills the wish of Doctor Feilehenfeld and is nothing more than an expression of what the General Reporter explained to us a few minutes ago.

The GENERAL REPORTER. Mr. Mehren, with his usual felicity has added just the right note, I believe, and it is entirely acceptable to the General Reporter if it fulfills adequately the desires of the German delegation. [Assent.]

Mr. E. S. SIRAPNELL-SMITH (England). I desire to suggest to the General Reporter and to this conference the addition of two words to (a). It is to insert at the end of line 1 the words "space and." It would then read: "Parking restrictions through the application of space and time limits or prohibitions."

I also desire to ask consideration in (c) as to whether the wording covers vehicles en route as well as standing vehicles.

I think consideration should be given to whether or not the wording of (c) sufficiently covers vehicles en route as well as standing vehicles. If it were thought desirable to insert the "en route" after "vehicles" in (c), it might be necessary to have a new clause between (b) and (c) which might read somewhat as follows:

Standing vehicles which are most of the time on extreme limits of the carriageway.

The GENERAL REPORTER. The suggestion which has been made by the delegate from Great Britain with respect to paragraph (c) is,

I believe, quite appropriate, as it was intended to apply only to moving vehicles. Thus, if the paragraph (c) were to read, "The regular alignment of moving vehicles," or rather, "The regular alignment of vehicles en route," which would include vehicles temporarily stopped at a "stop" and "go" signal preparatory to release and subsequent movement, the entire paragraph would then read, "The regular alignment of vehicles en route through the use of traffic-lane markings."

I regret to say that I do not understand the significance of the phrase which was proposed to be inserted between the present paragraph (b) and (c).

Mr. E. S. SHRAPNELL-SMITH (England). By the leave of the meeting and of the Chairman, I should like to explain to Doctor McClintock in a few words that, as I read these recommendations, nothing is laid down concerning the obstruction due to standing vehicles at the roadside close to the curb delivering or receiving goods or dropping people for shopping or other purposes; and I would repeat for his consideration the expediency of providing that such vehicles must bear close to the curb on the extreme limits of the carriageway.

The GENERAL REPORTER. The type of regulation which has been suggested by the British delegate is, I think everyone will admit, quite appropriate. It would, however, appear to me somewhat inconsistent for incorporation in this series of recommendations, which do not purport in the sequence to be detailed regulations but merely a category of type of regulations. And may I not ask if that particular provision is not amply covered, at least by implication, in the amendment which has been proposed for subparagraph (a), in which it is recommended that at the end of the first line the words "space and" be added, and may I say in addition that that amendment is entirely acceptable, and, I believe, adds to the definiteness of the recommendation.

Thus, as I would interpret the added words "space and time limits," it would refer to parking regulations relative to those spaces or parts of the street in which vehicles might properly stand or from which they might properly be excluded by prohibition.

The CHAIRMAN. Is there any further discussion on conclusion 3? We have got down as far as (a), (b), (c), and now we can take up paragraphs (d), (e), (f), and (g). Is there any further discussion? [No response.]

If not, I will ask the General Reporter to read conclusion 3 as you now have it.

The GENERAL REPORTER. There are no amendments suggested to conclusion 3 (pars. (d), (e), (f), and (g)). Therefore, I shall read

only that part of the conclusion to which amendments have been suggested:

No. 3. The Congress recognizes that the design of rules and regulations for the facilitation of traffic in congested districts is a problem of growing complexity and that specific control measures should be applied only after a competent study of local conditions by qualified officials and the cooperation of the interests affected. Under suitable conditions the following types of regulations have been found useful:

(a) Parking restrictions through the application of space and time limits or prohibitions.

Paragraph (b) has not been changed by suggestion.

Paragraph (c) The regular alignment of vehicles en route through the use of traffic lane markings.

The CHAIRMAN. Are there any objections? [No response.] [Adopted.]

It has been moved and seconded that the whole conclusion with the amendments be adopted. Are there any objections? [No response.] [Adopted.]

The CHAIRMAN. Now we take conclusion No. 4.

The General Reporter reads No. 4, first paragraph (general principle and subparagraph (a)).

The CHAIRMAN. Is there any discussion as to the general principle of conclusion No. 4? [No response.] [Adopted.]

Then we will pass on to (a).

Sr. BOMBA (Argentina). I have just arrived in the hall and find that this very important subject of the entrance of railroads into large cities is being discussed. Without doubt the best method would be, according to the conclusions expressed here, or the suggestions made by the delegate from England, by elevated tracks, but all of these works are of great importance and very costly; they can not always be attained according to one's wishes so far as safety, comfort, hygiene, and beauty in the cities are concerned. It means spending much money, and I do not know if the Congress has done anything with reference to financing which would offer suggestions as to the manner in which such large and costly works might be financed. Who will pay for them? The railways? That, however, would mean to make a charge against their facilities; no; the shippers who bring their products from great distances would pay it. They, the people of the agricultural districts, would have to provide conveniences such as elevated tracks for the people of the cities. Without doubt these great costs should be borne by those of the cities who will obtain the benefits of such works. For example, the railway laws of my country provide that the profits on the capital invested in the railways must not exceed 6 to 8 per cent. If the companies have to undertake constructions involving millions, some one has to pay

for them. Does the company pay them? If so, they must augment their capital, which would mean that the rates also would have to be raised. In consequence, the charge would be met by the agricultural workers in bringing their products from long distances to the centers of population. Does the State pay them from its budgeted income? That would also appear unjust because the works should be paid by those who benefit therefrom and in proportion as they benefit. I should like, gentlemen, to confine myself solely to this aspect of the question which undoubtedly is of great interest. When it is agreed to do a certain thing it should be added that it is to be done with such and such resources, and by such and such means. I do not know if the Congress has considered this point in order to make suggestions for the different countries that encounter the problem.

The GENERAL REPORTER. May I point out in the first place that conclusion No. 4 (par. (a)) does not deal with matters of highway finance. Those subjects have been discussed and conclusions passed at other meetings.

It would seem to be the duty of this Section, convened for the purpose of considering the proposals with reference to traffic regulation, to consider those improvements which are desirable in communities to relieve traffic conditions: naturally, of course, limiting our conclusions so that the financial burden involved will not be obviously absurd.

May I suggest that the Congress has adequately protected itself, for the reason that subparagraph (a) begins with the words "where economically possible."

The CHAIRMAN. Are there any objections against paragraph (a)? [None.] [Adopted.]

The CHAIRMAN. We will now pass on to (b).

The General Reporter reads paragraph (b).

Mr. JAX DOWNER (United States). I would like to insert in the third line of paragraph (b), after the word "subways," the two words "or bridges"; and again, after the same word "subways" in the fifth line, the same two words "or bridges."

In support of this proposed addition, may I call your attention to the fact that in many locations subways are difficult to maintain in a sanitary condition, and unless adequately policed may become hiding places for criminals. We should therefore recommend bridges where they are more suitable than subways.

The GENERAL REPORTER. The recommendation of the American delegate is entirely acceptable to the General Reporter. It was not the intention in drafting the conclusion to limit the type of structure to any one particular class, but rather to indicate the necessity and

to propose the principle of providing adequate protection and convenience to pedestrians on heavily traveled streets by affording them some means of crossing from one side to another without becoming involved in the traffic in the roadway.

Sig. ARTURO MENCANTI (Italy). I represent, as you know, a country in which the conversion of pedestrians into motorists is not yet as extensive as we would wish and as it is in the United States. Therefore, the question of crossings of vehicles and pedestrians is, in my country as in many other countries of Europe, still more important than in North America.

We still have our pedestrians in general making crossings anywhere, without regard to zones, and too many municipalities still have failed to establish crossing lanes. Under these conditions, I believe that it would be important for many of the countries of Europe to have the suggestions of this International Congress cover also the use of street-crossing lanes and to include this matter in paragraph (b) of Section 4. I propose, therefore, to add to paragraph (b) that the passage of pedestrians must be facilitated or protected by the adoption and construction of crossing lanes on the surface, and where that would be insufficient, through the construction of subways or bridges, etc.

The GENERAL REPORTER. The proposal which has been made by the delegate from Italy is entirely appropriate and may well be incorporated as an addition to paragraph (b) of conclusion 4. Thus to add the following words to paragraph (b) as now printed:

Where traffic is not sufficiently heavy to warrant such structures, pedestrian traffic can be facilitated and protected by the use of definitely marked pedestrian lanes at street intersections and at other natural places of crossing.

May I ask if that meets the contention of the delegate from Italy? [Assent.]

The GENERAL REPORTER. Thus the whole paragraph (b) of conclusion 4, as amended, would read:

The passage of pedestrians across heavily traveled streets can be facilitated and protected through the construction of subways or bridges at street intersections or other natural places of crossing. In certain districts it may be desirable that such subways or bridges be sufficiently close together so that any crossing of the street surface by pedestrians will be rendered unnecessary. Where traffic is not sufficiently heavy to warrant such structures, pedestrian traffic can be facilitated and protected by the use of definitely marked pedestrian lanes at street intersections or other natural places of crossing.

The CHAIRMAN. Is there any further discussion or objection? [No response.] Adopted.

We will now go to paragraph (c).

The General Reporter reads paragraph (c).

Mr. E. S. SHRAPNELL-SMITH (England). I submit to the conference that the use of the word "prohibition" in line 1 goes too far. Prohibition, etymologically, is an absolute term, and I think what is meant there is the progressive measures of restriction, rather than any permanent prohibition of parking.

Lower down in the paragraph reference is made to public inconvenience, but any restriction of parking will per se also affect the public pocket. Not only does it affect the public pocket but those engaged in industry may be subjected to economic hardships if parking facilities are prohibited.

I desire, therefore, to ask the General Reporter if for the word "prohibition" he would accept the four words "progressive measures of restriction"; if, after the word "parking" in the first line, he would insert the two words "on highways"; if, after the word "inconvenience" in line 2, he would accept the additional words "or economic hardship"; and I suggest that after the word "loading" in the penultimate line of the clause it might be wise to insert "unloading."

The GENERAL REPORTER. The suggestions which the British delegate has made seem to be entirely acceptable with one possible question.

The insertion of the words "on highways" after the word "parking" in the first line is, I believe, questionable, for a reason which perhaps is entirely local to the United States. In our terminology, a highway refers only to a rural way. However, if it meets the intention of the British suggestion that the words "on streets" be used, that, I think, will be entirely clear, both from the British and from the American sense.

The insertion of the words "or economic hardship" after "inconvenience" in the second line is also acceptable.

Mr. E. S. SHRAPNELL-SMITH (England). Two members of the British delegation have pointed out to me that to put in the words "on streets" would have difficulty in British nomenclature, and perhaps it would be better to put nothing after the word "parking," as the sense seems pretty clear.

M. LOMMEUX (France). We understand clearly the interest of the proposition which has just been made by our British colleague, but we would like to retain the words "prohibition of parking" and add simply the words "or restriction." It would be understood that parking might be either limited or completely prohibited. With this small modification the French delegation has no objection to make to the amendments which have been proposed.

The CHAIRMAN. I will now ask the British delegation if they intended to strike out the words prohibiting parking, in there, or would you be willing to leave it in with the additional words?

Mr. SHRAPNELL-SMITH. Yes; with the two words.

Sig. ARTURO MERCANTI (Italy). We are, in Italy, the heirs of a civilization thousands of years old, and we have come here to admire the results of the new American civilization. We, nevertheless, are ourselves in a very different situation. Many among you have already realized the conditions of a city such as Milan, which of all Italy has the most active business life and the greatest amount of traffic.

There are narrow streets, and for these it is proper to prohibit parking; but on the other hand there is a tendency on the part of certain of our municipalities to restrain parking and even to prohibit it entirely upon the large open squares, for esthetic and artistic reasons.

Now, although the question of parking might seem a secondary matter, we observe that the development of automobile traffic in the United States would not have been so great if people had not been able, in the principal streets, to park their cars as we see them do in Washington, for example. The question of parking of cars is therefore, in my opinion, an economic question bound very closely to the development of motoring. I should not like to see the terms of conclusion (c) as encouraging municipalities to limit the right of parking in city squares; so I should like to request our General Reporter to insert some words to encourage municipal authorities to facilitate the parking of automobiles wherever it is possible without hindering the movement of traffic.

The GENERAL REPORTER. Paragraph (c) of conclusion 4 does not directly or by implication suggest that in any particular situation, or indeed in any particular city or country, that parking should either be restricted or prohibited. It does indicate, however, in connection with the covering phrase at the beginning of the conclusion, that under the circumstances, where the restriction or prohibition of parking becomes necessary in order to maintain the capacity of the street and to facilitate the movement of traffic throughout the city, encouragement should be given to the provision of alternative off-street facilities for storage in the form of garages or similar structures.

I assure the delegate from Italy that as I read the paragraph it does not in any way, directly or indirectly, indicate the necessity for restriction.

The CHAIRMAN. Is there any further discussion at this time?
[No response.]

If not, I will ask the General Reporter to read the paragraph as amended.

The GENERAL REPORTER (reading) :

In order that prohibition or progressive restriction of parking may be applied without undue public inconvenience or economic hardship, encouragement should be given to the provision of off-street storage space economically and conveniently available. The Congress holds that in certain cases it may be proper to require in the construction or remodeling of buildings the incorporation of suitable space for the off-street loading or unloading and garaging of vehicles.

The CHAIRMAN. You have heard the reading of paragraph (c) as amended. Are there any objections? [No response.] Adopted. We will now go to paragraph (d).

The General Reporter reads paragraph (d) of conclusion 4.

Mr. F. L. D. ELLIOTT (England). The British delegation suggests a small amendment to the paragraph (d) which to those of us present is merely a matter of form, but to the less instructed reader may correct a serious misunderstanding which otherwise might subject the conclusion to gross criticism.

All of us here hold the questions of life must take precedence over economic questions; and the British delegation, therefore, thinks it would only express the consensus of opinion if the first words of the paragraph were altered to read thus:

The Congress holds that traffic congestion and the resultant—
these are the new words—

risk of accidents as well as the economic losses,

and the balance to continue as heretofore read.

The GENERAL REPORTER. The suggestion made by the English delegate is acceptable to the General Reporter.

The CHAIRMAN. Are there any further discussions or objection about paragraph (d) as amended? [No response.] Adopted.

Next is the conclusion No. 5.

The General Reporter reads conclusion No. 5.

The CHAIRMAN. Is there any one who wishes to be heard on conclusion No. 5? [No response.] Conclusion No. 5 is adopted.

Mr. JAY DOWNER (United States). Mr. Chairman and gentlemen, several of the distinguished delegates have referred this morning to the necessity of the control of signs along highways for reasons of safety, and for those reasons as well as for other obvious reasons we desire to offer an additional conclusion which may be stated as follows:

Conclusion No. 6. The Congress holds that roadside developments should be considered an integral part of road building. Adequate control of the roadside

by highway authority is essential to advance the safety and recreational value of the highway.

The CHAIRMAN. Is there any discussion on this sixth conclusion as suggested by the American delegate?

The GENERAL REPORTER. May I say that as General Reporter I did not incorporate any conclusion or recommendation in the formal report on this subject, for the reason that I had restricted myself precisely to what I consider the definite limits of the question?

However, I wish to say this: That I believe that the proposal which has been made by the American delegate is entirely in harmony with the subject matter which is presented in this report, and that such action as has been proposed, if approved by the Congress, would have a very helpful effect. I can say with assurance in the United States, and I think without doubt from my converse with delegates from the other countries that it would likewise be helpful in those countries, in restricting abusive uses of road-sides by advertising agencies in the erection of signs which detract from the beauty of certain types of roads and which likewise add to the hazards of the highway, sometimes by blocking the view of drivers and sometimes by distracting their attention from the business of driving to the reading of the advertisements.

For this reason, while the recommendation was not included in the original formal report, I wish you to know that it is entirely acceptable to the General Reporter, and I believe quite in harmony with proper action on the part of this Congress.

Mr. J. S. POOL-GOPHILL (England). So far as the British delegation are concerned, we are generally in favor of what we understand to be the intention of the mover of this additional conclusion; but we are somewhat concerned at the proposed phraseology.

"Development of the roadside" is an extraordinarily broad term, and we can not see at the moment how far that might go. What we understood as the intention was that the highway authorities should have due regard to the amenities of the roadside; and I suggest that if that meets the views of the mover that the word "amenities" might be substituted for the word "development" for the reasons which I have stated.

The GENERAL REPORTER. Gentlemen, I have prepared a draft which I hope incorporates the ideas of the original proposer and the suggestions set forth by the British delegate.

The sixth conclusion would read then as follows:

The Congress holds that highway officials should give due regard to the amenities of the roadside and should be given such powers as may be necessary to give reasonable protection to highway safety and the recreational value of the road.

The CHAIRMAN. I understand that the conclusion as read meets the approval of the United States delegate and the English delegation. [Assents.]

Is there any further discussion or objection about this sixth additional conclusion? [No response.] Adopted.

Is there any discussion of the entire report or of the conclusions as approved at this time? [No response.] They are adopted.

Is there any further business to come before this session at this time? [No response.]

(Adjournment of Section 2.)



SECTION CHAIRMEN AND SECRETARIES

PLENARY SESSION FOR PASSING UPON CONCLUSIONS. FRIDAY,
OCTOBER 10, 1930, 2 P. M.

EDWARD J. MERRIN, Chairman.

ALVIN L. GUMENY, Secretary.

The CHAIRMAN. The Chair wants to draw attention to the fact that it will be necessary on the part of delegations to call attention to minor discrepancies between the present German, Spanish, and French translations, and the English. That will expedite matters very considerably. The translators and the heads of delegations will get together immediately after the conclusion of this meeting in room No. 10 and agree upon the correct translation.

We will take up the resolutions on Question 1(A): "Results obtained by the use of cement."

The General Reporter, Mr. Sheets, unfortunately had to go home, but Mr. James has kindly agreed to act as General Reporter in his stead.

The ACTING GENERAL REPORTER (Mr. James). So we are, therefore, on consideration of the conclusions adopted by Section 1. Question 1(A). These conclusions are now before you. What is your pleasure?

Lient. Col. J. E. BLACKWELL (England). I wish to suggest several corrections and propose they be approved by the present meeting.

The CHAIRMAN. The Chair would ask the British delegate if he will read the corrections for each paragraph, and would suggest to the Congress that action then be taken on those corrections for each individual paragraph, after, of course, the usual comment by the reporter.

Col. J. E. BLACKWELL (England). No. 1. Let "rapid-setting" read "rapid-hardening."

The CHAIRMAN. Is there any objection? None.. Adopted.

Lient. Col. J. E. BLACKWELL. No. 4 to read: "Where a large volume of traffic, not containing a high proportion of heavy, steel-tired traffic, is encountered, 2-course concrete pavements, with the upper layer composed of very hard aggregates, have been successful. Other surfaces on concrete base courses have also met this condition satisfactorily."

The ACTING GENERAL REPORTER. With respect to that, it seems to me that you practically have changed the intent of the conclusion.

Of course, gentlemen, I am acting as General Reporter for Mr. Sheets, who is absent. What his mind was at the time this conclusion was being discussed the other day, I am unable to say. I feel very certain, however, that had the United States delegation understood that the intent of the paragraph was to advocate the general use of 2-course concrete pavements when there is but little or no steel-tired traffic, that there would have been opposition.

Lieutenant Colonel BLACKWELL. With due respect to the General Reporter, I suggest that what I have just read is the amendment as approved by the meeting the other day and is not a new suggestion put forward by the British delegation to-day.

The ACTING GENERAL REPORTER. I am under the impression that the report as presented is the wording as we understood it the other day. But had we understood it the other day as you would have opposed it then.

M. LOUREUX (France). The text of resolution No. 3, league Mr. Blackwell contests, in our opinion, conform the French version, to the text adapted the other day, section.

In accord with the General Reporter, the French delegation requests that it not be changed.

Sr. JEAN AGUSTIN VALLE (Argentina). The Argentine delegation shares fully the idea formulated by the Reporter with respect to the construction of concrete pavements. In our country, we have built concrete pavements of one layer and they resist moderate traffic sufficiently well; therefore I do not believe we could vote for the conclusion as proposed now by the distinguished British delegate.

Maj. FREDERICK CHARLES COOK (England). Mr. Chairman, I debated this matter at some length on Tuesday and came to a certain conclusion which is supported by the official record. I therefore suggest that, since this is a matter of record, the British delegates should discuss it with the General Reporter in order to arrive at an agreed solution, this to be put to the Congress at a later hour.

The ACTING GENERAL REPORTER. I agree with the proposition and move you, gentlemen, that No. 4 be referred to conference between myself, the British delegate and others, and then put to you. (This motion, seconded by the Argentine delegate, is carried.)

The CHAIRMAN. Lieutenant Colonel Blackwell had some remarks about the other paragraphs of the conclusions.

Lieutenant Colonel BLACKWELL (England). No. 5 appears to be approved by the meeting. The question has been raised since then whether it is correct to speak of "maximum wheel loads." "Maximum" has no limit and it might be considered an absurdity to suggest that any kind of road surface will carry unlimited wheel loads.

May I ask whether some qualification of "maximum" should be put in by the people who are correctly wording the conclusion?

In the case of No. 6, the translation from the French in the printed bulletin is not the translation as approved by the meeting. This will be dealt with in the meeting in room 410 later.

There appears in the text a sentence which was not included in that approved by the meeting, and it should omit "A protective wearing surface seems equally indispensable on cement-bound and water-bound macadam."

The CHAIRMAN. That also would seem to be rather a matter of record and could be settled by consulting the record.

Colonel BLACKWELL. Yes; that is satisfactory.

The last sentence of the amendment as approved is omitted from the bulletin and reads as follows:

the fact that a number of concrete roads have been successfully laid without joints, it is advisable that further research should be made on the subject of joints and cracks.

CHAIRMAN. This, too, could be settled by consulting the record.

Colonel BLACKWELL. The British delegation will be satisfied by the record.

Acting General Reporter. Mr. James, and several representatives of the British and of other delegations retire to discuss No. 4; when they come back Mr. James makes the following statement:)

The ACTING GENERAL REPORTER (Mr. James). Mr. Chairman and gentlemen, in accordance with an earlier motion of this body, I and delegates interested in No. 4 of the conclusions met in conference, and, as my experience has previously many times indicated, when engineers can get together and talk over what is in their minds they are very apt to agree.

It was only necessary for each of us to understand the various points of view, when we could draft without any difficulty a satisfactory paragraph to us all.

The first paragraph of No. 4 is therefore resubmitted in the following form:

4. Where a large volume of steel-tire traffic is encountered, if cement concrete is adopted as a pavement material, a 2-course pavement, with the upper layer composed of very hard aggregates, should be used instead of a single-course pavement.

The CHAIRMAN. Is there any discussion? [The proposal of the General Reporter is moved by a delegate of Great Britain, seconded by a delegate of France, and carried unanimously.]

The CHAIRMAN. We will now proceed to Question 1 (b): "Results obtained by the use of brick and other artificial paving."

The question of disposing of the conclusions under the heading 1 (b) is now before you. Is there any discussion? [No response.]

A motion to approve the conclusions being duly moved and seconded, the conclusions are adopted by the Congress.

The CHAIRMAN. We will now proceed to Question 2, "The most recent methods adopted for the use of tar, bitumen, and asphalt in road construction?"

Question 2 and its conclusions are now before you. What is your pleasure? Are there any remarks on the conclusions of Question 2? If, not, a motion to approve is in order. The approval being moved and duly seconded, the conclusions of Question 2 are adopted.

The CHAIRMAN. We have now before us the conclusions under Question 3, "The construction of roads in new countries such as colonies and undeveloped regions."

A delegate moves that the conclusions be approved.

This motion, being duly seconded, is unanimously carried.

The CHAIRMAN. We are now to the conclusions on Question 4, "Ways and means of financing highways." Are there any remarks or is there any discussion?

A delegate moves that the conclusions be approved.

The motion, being duly seconded, is unanimously carried.

The CHAIRMAN. We now have the conclusions on Question 5, "Highway transport." What is your pleasure, gentlemen? If there be no discussion, motion to approve is in order.

A delegate moves that the conclusions be approved.

The motion being duly seconded is unanimously carried.

The CHAIRMAN. We now come to the conclusions of Question 6, "Traffic regulation * * * etc." Is there any discussion?

Sr. ENRIQUE CORONADO SUAREZ (Colombia). In connection with the Sixth Question, the delegation of Colombia wishes to state that in accord with a recommendation of the administrative council of the Pan American Union, the Governments of the American Republics authorized their respective delegations at the Sixth International Road Congress, to study and subscribe to the plan formulated by the Second Pan American Congress that was held in the city of Rio de Janeiro, in August, 1929. Therefore, the said delegation met in a special session in Washington, on the 4th of October, 1930, and subscribed on the 8th of the same month to the aforementioned project covering the convention on the regulation of automotive traffic.

The CHAIRMAN. As the chair understands the suggestion of the delegate from Colombia, it is not that there be included anything new in the conclusions under Question 6, but that this Congress take note in the minutes of its proceedings of the important meeting to which the delegate, refers. [Expressions of assent.] Therefore,

gentlemen of the Congress, you have before you the conclusions on Question 6.

The motion for approval, being duly seconded, is unanimously carried.

The CHAIRMAN. We have finished with the conclusions of the six questions. Are there any other matters to come before the Congress?

Sir SEYMOUR WILLIAMS (England). Gentlemen, I have been asked by my friend, Colonel Crosby, who was summoned away suddenly by a telegram, to read the following message to you:

We have discussed whether tar or asphalt or bitumen or other materials will be the best solution of road treatment, but as yet we do not seem to know. We realize that they all give good results. But we do know that a man among us has directed the attention of the world to the use of tar and the study of similar road materials. He is Dr. Guglielminetti, who founded 25 years ago the first antidust league.

Colonel Crosby desires to suggest that you all agree to extend a vote of appreciation on this auspicious occasion to Dr. Guglielminetti. [Applause.]

The CHAIRMAN. Is that motion seconded? It is supported by the delegate from Argentina.

Are you ready for the question? This, the Chair would think, is a very graceful tribute to a very eminent character in our special field. The motion is unanimously carried.

Doctor GUGLIELMINETTI (Switzerland). Gentlemen, I am deeply touched by your great courtesy, and I shall simply say in four languages: *Merci bien*, many thanks, *danke schön*, *muchas gracias*.

M. LORIEUX (France). Gentlemen, we have gained much instruction from this International Congress, which will count certainly among the most remarkable of all the Road Congresses. We have observed, from the technical point of view, that the engineers of all nations are now in possession of methods which permit them to construct and maintain roads appropriate to the importance and the nature of the traffic. We have also observed that the construction of these roads demands preliminary studies of the soil and terrain, a careful examination in the laboratory of the materials to be used, and we have seen in our interesting visit to Arlington how much effort is necessary to succeed, as the Americans succeed, in the construction of roads of concrete and asphalt. We recognize, therefore, that much money is necessary to plan, construct, and maintain roads. We have been told by important personages that the road, the good road, is the foundation of the economic development of any country.

From all this we may conclude that our task as engineers is dependent upon the money which our Governments will place at our

disposal in each of our countries. I see, judging by the discussions which took place in connection with the fourth question (financial means) that all engineers, in all countries, complain that they have not sufficient means at their disposal, and consequently I propose to the Congress to pass a resolution as follows: 'The Congress resolves that the attention of the public authorities be drawn to the present importance of the road problem and to the benefit which would result to them in consecrating for the improvement of road systems more and more important sums. [Applause.]

Sr. JUAN C. BORRA (Argentina). The excellent ideas expressed by the delegate from France with their fundamental suggestions as to the problems taken up in this Congress, have suggested to me that it would be well to say a few words on the subject of financing the cost of road construction. Not all of the countries represented here have the same system of government, the economic capacity, the financial efficiency, nor the same institutional regimes. Therefore, it is not possible to recommend that the financing be done by a system of bonds or by means of budget funds; but, according to the proposition sanctioned by the second section relating to financing of road works, there has been conceived a formula which has a comprehensive application for all countries whatever their juridical organization, which is that the roads should be paid for by those who benefit therefrom and in proportion to the benefit received. This standard suggests the sources of resources and this form is suitable for universal application, whatever might be the form of government or the situation of the country.

Therefore, gentlemen. I wish with your permission, after having remarked on the work accomplished by the members of this Congress and its organizers and by those who have had active, intelligent, and efficient participation therein, to refer to another phase of our subject, with the permission of the delegates, embracing highways, transportation, and tourist travel. It is not only the material aspect but it is also the spiritual phase of this great problem. It is not only to facilitate for men and towns the economic exchange of their products in the most commodious manner but it is a fact that these Congresses when they are studying the methods of starting these works are at the same time doubtless accomplishing a real human work because communications bring men and towns closer together, and when there exists a closer contact between them true relations are established inasmuch as deep down in the human spirit of all men, whatever their civilization, their sociological ideas, their progress, there is a sense of truth and a sense of justice and a desire for peace. We, when we have completed the work of communication and reached all people—in the manner of Marconi from his yacht in the Mediterra-

nean lighting the lamps of Sydney, or of Eckener in his Zeppelin encircling the globe—will better understand each other and then there will be a possibility of peace.

The CHAIRMAN. The Chair takes it that the delegate from the Argentine seconds the resolution of our colleague from France. The motion is before you. Is there any further discussion? [No response.] The motion is unanimously carried.

Sr. JUAN AGUSTIN VALLE (Argentina). Mr. President, delegates, in behalf of the delegation from Argentina, permit me to submit, for the approval of this assembly, the following resolution: In order to supplement the efficient work carried out by the Permanent Commission of International Road Congresses, the Sixth International Road Congress, held in Washington, resolves to request the governments represented in this Congress and adhering to the Permanent International Commission of Road Congresses in Paris that they appoint a national commission which will cooperate with the Permanent International Commission in its important campaign for the improvement of roads throughout the world.

I claim that, if we wish to make effective the motto of our worthy association "The Highway is Life," we in our own countries are obligated to collaborate in the labor of these Congresses which have done so much to perfect modern automobile transportation. In our judgment it is necessary to help the Permanent Commission to succeed in the separate countries, in order that the conclusions approved by these Congresses be put into practice. The work of the Association has been brilliant and efficient but if we aid it in the form proposed, in my judgment, even more splendid and promising results must follow.

The CHAIRMAN. Members of the Congress, you have heard the motion.

The delegate from China seconds the resolution. Is there any discussion?

M. PAUL LE GAYRAN, The Secretary-General, Permanent International Association of Road Congresses. Gentlemen, the proposition which the delegate of Argentina has just made, supported by the delegate from China, answers considerations which we have not ignored. Certain among our colleagues have often informed us of their desire to have in each country a permanent local organization which could handle, in direct cooperation with the international executive bureau, the affairs relative to the International Association of Road Congresses.

You know that the Permanent International Association, which organizes the Congresses in different countries, has a very heavy task; from its headquarters the permanent executive bureau is obliged to

keep itself in touch with the government delegates and members of the association throughout the entire world; the correspondence is heavy. The necessary voyages of the delegates to attend the annual meeting, which is usually held at Paris and eventually in the European cities where the Congresses are held, are long. In these conditions the creation of a body, small in numbers but important by the quality of its members, in each of the countries associated with our association would mark a considerable progress for the betterment of our association. I might cite as an example that in Great Britain for some years past a "British organizing committee" has functioned admirably along the lines I have just indicated. This committee, composed of a very few persons, is the permanent correspondent in England of the central executive bureau. We work with it in close and continual cooperation, and it is certainly due to its action that the number and the quality of British delegates in this Sixth Congress at Washington is so large.

Speaking both for myself and for the executive bureau, I can only thank our colleague from Argentina for having had the idea of presenting this motion. I join with him in submitting this motion for your consideration, and I may tell you that the executive bureau will see therein a mark of confidence in its work and also of confidence in the future of our association. [Applause.]

Mr. J. S. POOL-GONSAL (England). Mr. Chairman and delegates, I am afraid when the resolution was read I didn't appreciate its purport, and accordingly I did not second the proposal; but I now understand from Monsieur Le Gavrian that the proposal is that there should be some sort of organization similar to that which exists between the British Organization Committee and the permanent commission, set up in each country, and on the distinct understanding that that is the proposal. I should most certainly second it.

I only wish to propose a very slight verbal amendment: Instead of its reading "That they appoint a national commission" write: "That they should each appoint a national commission."

Sr. JUAN AGUSTIN VALLE (Argentina). I accept this modification which is in accordance with my intentions.

M. LE GAVRIAN. I also am in accord.

The CHAIRMAN. Are there not other delegations that would like to be heard?

The PRESIDENT GENERAL (Mr. Chapin). Gentlemen, speaking on my behalf, and I hope on behalf of the delegation from our country, I think that this is a very wise thing. There are a great many countries that have only a few members on the permanent commission at the present time, and it seems to me that this would be a

means of arousing a world-wide interest in highways, and permitting it to be handled in a genuinely world-wide organized manner. Therefore, I would like to second the motion.

The SECRETARY GENERAL (Mr. MacDonald). Mr. President and delegates, from the practical standpoint of organizing a conference of this character, may I assure you that the presence of an organizing commission, a permanent organizing commission in each country, is very helpful, as is evidenced by the large delegations from England, from France, and from Italy. May I speak also to my friends in Germany, where the next Congress will be held, and offer them my advice that they support this motion very heartily, as it is very difficult to organize a convention and to secure a large number of delegates in a country or from a country that is unorganized in this manner; and there are a multitude of questions which may be settled more satisfactorily if there is a permanent body that will function as have the different bodies which are permanently organized.

And we appreciate so greatly the cooperation which we have received from them that I add this word of support to this motion.

Dr. ULRICH STAPENHORST (Germany). I may remark that we support the motion throughout. We have a similar arrangement in Germany which has proved itself very useful.

The CHAIRMAN. The question, gentlemen of the Congress, will be upon the motion proposed by the delegate of Argentina, amended by the delegate of Great Britain.

The motion with the amendment duly seconded is carried unanimously.

The CHAIRMAN. Is there any further business to come before the session?

Mr. H. S. ROUSE (Hong Kong). Before we close this last session of the Sixth Congress of the Permanent International Association of Road Congresses, I would propose a hearty vote of thanks to our General Reporters for the work that they have undertaken in collating all the reports that they have received from the many nations and drafting them into the conclusions which we have just passed. [Applause.]

Mr. J. S. POOL-GODSELL (England). Mr. Chairman and gentlemen, I shall detain you only a minute, but I do not think we ought to part until we have passed also a most hearty vote of thanks to the Chairman, for the manner in which he has conducted this full meeting of the Congress. [Applause.]

The CHAIRMAN. The Chair desires to express his appreciation for the hearty good-will of the Congress, and to thank the Congress again for its forbearance and patience.

Sr. ENRIQUE CORONADO SUAREZ (Colombia). Inasmuch as votes of appreciation have been presented to the speakers and to the Presidents of the separate committees for their magnificent accomplishments, I wish at the same time to ask the assembly to give a vote of sincere applause to the interpreters for the very able manner in which they have given us the opportunity, by their translations, of keeping in touch with all the activities of this assembly. [Applause.]

(Adjournment of plenary session.)

CLOSING PLENARY SESSION, FRIDAY, OCTOBER 10, 1930, 8 P. M.

The PRESIDENT GENERAL (Mr. Roy D. Chapin). Ladies and gentlemen of the Sixth International Road Congress, it is with the utmost regret that I call together this last meeting of this Congress.

The INTERPRETER. The chair has received the two following telegrams in reply to those sent last Monday to Senator Mahieu, president of the Permanent International Association of Road Congresses in Paris, and to Monsieur le Chevalier Lagasse de Locht, former president of the Second International Road Congress at Brussels. These telegrams read:

I beg leave to convey to the organizing commission, to the president, and members of the Sixth Congress both my heartfelt regret not to be there with them and my best wishes for the greatest measure of success in their labors. I hope to be there very soon to admire and study the tremendous strides made in America in the art and technique of highway construction.

ALBERT MAHIEU.

My thanks to the International Association, together with my best wishes for the congress.

LAGASSE DE LOCHT.

The PRESIDENT-GENERAL. (Speaking in English.) We had hoped to have with us this evening as one of our speakers the honorable, the Secretary of Commerce of our Government. Unfortunately, he was called out of the city to-day, and I have this letter from him which I desire to read to you:

It is with regret that I have to advise you of my inability to attend the closing, plenary session of the Highway Congress and to address the Congress at time. Unexpected and urgent official duties which require my absence in Washington on Friday night make it impossible for me to avail myself of this kind invitation.

I have observed the progress of the Sixth International Road Congress with a great deal of interest. It represents to me a significant manifestation of a spirit of international cooperation in the solution of problems which affect all mankind.

The cultural benefits of good roads are now generally recognized. Their commercial significance, particularly since the advent of the automobile, has made us realize that the economic well-being of any country is now inextricably related with the construction, financing and maintenance of an adequate system of highways. There is no more effective means of consolidating the international economic structure than by increasing and improving our systems of physical communication.

To those important matters and to the fundamental consideration of efficient and wise highway financing programs, we must devote our best thought and efforts, for as we build our highways we are strengthening those great civilizing forces of progress which not only contribute to our prosperity, but make our lives more complete.

It is necessary only to peruse the reports submitted during the sessions of this Congress, and to sense the splendid spirit of cooperation and enthusiasm which has permeated the gatherings of the delegates, to be sure that the work of this international assembly will be of vital importance.

The intangible benefits which must follow the interchange of ideas of experts from all parts of the world should be of almost equal importance. I wish to congratulate most heartily the Permanent International Association of Road Congresses, and others who have contributed to the success of this Sixth Congress, as well as the delegates whose attendance has made possible those results.

May I express to the officials of the Permanent International Association my best wishes for the continued success of that organization.

ROBERT P. LAMONT.

Secretary of Commerce.

The PRESIDENT GENERAL. I am going to interrupt our ceremony for a moment for a resolution of sympathy. I call upon the delegate from Colombia, Mr. Coronado.

Sr. ENRIQUE CORONADO SANCHEZ (Colombia, speaking in Spanish). Mr. President, delegates, ladies, and gentlemen, as always, in these sessions, and especially in the one which we are now attending, there are moments of joy and also moments of great doubt, of profound sorrow, such as the separation from the companions who have participated with us during the life of this unforgettable week in the discussions of a congress so transcendental as the Sixth International Road Congress which closes to-night. Considering one of these sad moments, I permit myself, gentlemen, to divert for a few moments your attention in order to ask that you join with me in seconding the following resolution which, while it appears out of order, I am sure touches profoundly the depths of our hearts, and which concerns one of the most historic republics of America. Permit me to propose the following:

The Sixth International Road Congress, considering that at the time this Congress is assembled, one of the American nations, birthplace of the civilization of the New World, is suffering the consequences of a great calamity that has covered its ground with tombs and ruins, and has filled the heart of the people of America with sorrow; considering that the Dominican nation was the first link between the civilization of the Old and the New World, that there was founded the first city of the Western Hemisphere, that there were established the first colonial institutions, that from there the navigators departed on voyages of discovery which incorporated a new continent into the world civilization; considering that the mem-

ories of an illustrious past give to the Dominican nation claims to the gratitude of America and, in fact, to the whole world, and that the magnitude of its misfortune and the serene courage with which it has borne its adversity have awakened feelings of sympathy and admiration throughout the world, be it resolved: That sentiments of the profound grief of the distinguished delegates to this Congress be put on record, and their sincere wishes be extended for a speedy re-birth of the prosperity of the noble Dominican nation and the happiness of its people.

SR. FRANCISCO J. SUCRE (Venezuela, speaking in Spanish). In the name of the delegation of Venezuela. I desire to second the proposition which has just been submitted by the delegate from Colombia.

Col. A. B. BARBER (United States, speaking in English). Delegates of the Congress, it has been with the greatest of sympathy and grief that our people have witnessed the passage of the great calamity over the Island of Santo Domingo, and that sympathy has been felt throughout the length and breadth of our land. We feel that there is little that can be done to relieve those who have suffered the loss of their loved ones by such a calamity, but we want in every way that we can to bring them some help, and we do extend our very heartfelt sympathy.

Therefore, on behalf of the American delegation, I heartily second the resolution.

The resolution is unanimously carried.

The PRESIDENT GENERAL. There is now the very pleasant task of your Chairman, to call upon various delegates in order that they may have an opportunity to say good-by, much as we regret to hear it.

Dr. HOMERO VITERI LAFRONTE (Ecuador, speaking in Spanish). Mr. President, ladies and gentlemen, the kindness of my colleagues, the distinguished representatives of the Central and South American nations, has conferred upon me the high honor of giving you on this important occasion, on behalf of the New World, some word concerning this important conference, especially to you, the representatives of other continents. On this occasion, as in the inaugural session, America desires to show once more that it forms one great human nucleus, one single soul, fundamentally, with an unquestionable feeling of social conscience and homogeneity, and in order to speak in its name one must be able to explain to any one of those national delegates that whatever might be said has to be guided by the fundamental ideas that are the common heritage of the new continent. And these essential ideas are marked with a fervor for the reign of justice and equality in the relation of men and peoples, in the vehement desire that understanding and solidarity link hu-

manity in the eternal bonds of friendship and peace. It is because of this that the American nations are not able to remain indifferent when there arises some project which signifies in itself and in its future operations an effective cooperation between peoples and between nations. The Sixth International Road Congress which closes to-day has without doubt contributed to the work of universal solidarity, and for this one should sincerely and without reservation commend the patient work of the organizing committees, as well as the efficient work of the very distinguished and illustrious delegations that have assisted in placing at the service of humanity the results of their accomplishments, their investigations, and their wise experience.

In the cyclopean work of true twentieth century heroes, you modest benefactors of the world have a place of transcendental importance. There is in your labor, as in no other, the clear and concrete manifestation of the human power that modifies geographical limits, and you conquer and dominate it.

Your achievement, delegates, is due to free, constructive, and creative labor, and in this Congress the collaboration of many professional men who merit prestige and universal renown has resulted in conclusions that will serve as a pattern in favor of world activity, in the support of the political highways, as they will also serve as the base of future investigations which will continue the development of human progress to eventually crystallize in conclusions as important in future International Road Congresses as those made here. Each day solidarity and interdependent between men and nations become more and more imperative. In the interesting work accomplished in these recent days we have seen how the collaboration and best sentiment for solidarity has prevailed in every active committee beneath the expert and sure hand of those who have presided over them.

In order to end my speech, in the name of the different delegations of the countries of America who have honored me as their representative, and for myself, I wish to go on record as expressing our sincere appreciation for all of the kindnesses which the United States Government and the official institutions, both professional and social, of this great nation have extended to us, and each one of the delegates will surely never forget the good impressions received and the good friendships made in this beautiful and hospitable city of Washington. [Applause.]

Mr. MAU SUN (China, speaking in English). Mr. Chairman, ladies, and gentlemen, on behalf of the delegation from China, the honor falls upon me to express our full appreciation for the privilege of participating in the deliberations and conclusions of this

manity in the eternal bonds of friendship and peace. It is because of this that the American nations are not able to remain indifferent when there arises some project which signifies in itself and in its future operations an effective cooperation between peoples and between nations. The Sixth International Road Congress which closes to-day has without doubt contributed to the work of universal solidarity, and for this one should sincerely and without reservation commend the patient work of the organizing committees, as well as the efficient work of the very distinguished and illustrious delegations that have assisted in placing at the service of humanity the results of their accomplishments, their investigations, and their wise experience.

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Mr. MAU SUN (China, speaking* in English). Mr. Chairman, ladies, and gentlemen, on behalf of the delegation from China, the honor falls upon me to express our full appreciation for the privilege of participating in the deliberations and conclusions of this

eminent body of international experts on road construction and motor transportation assembled at the Sixth International Road Congress.

China, perhaps the oldest country in starting highway building at an early date, is yet the youngest nation in respect to achievements in modern road construction. We have, therefore, little to offer and much to learn. But we are sure that, whatever knowledge and experience thus gained at the present conference, will be of great value in hastening the early completion of the construction of the 24,000 miles of new roads undertaken by the Ministry of Railways, and in keeping up the repair and maintenance works on the 35,000 miles of roads already in existence.

Of the vast reconstruction plans that are being prepared by the national government for the development of communications, none is of more fundamental importance toward the immediate betterment of the well-being of our 440,000,000 people, than the building of roads and the promotion of motor transport.

The national government has already planned and promulgated a trunk-line system of highways in coordination with the railways and waterways of the country. Building operations are being pushed at a speed commensurate with the financial resources of the central government. While the different provinces have been carrying on road construction works with varying results, certain provinces, anxious to promote the good road movement, have been foremost in road building activities and have become strong centers of such a movement. For example, the Provinces of Kwangtung and Kueichow in the south, Chekiang in the east, Shansi in the north, and Szechuan in the west. At present there are about 20,000 miles of roads that are being constructed and projected by the different provinces.

In undertaking this great task of laying down the cornerstone of an economic highway system in China, we will be continually in need of the good advice and technical experience of the great road building nations of America and Europe. For this purpose, there is no better seat of learning where we can seek the wisdom of the past, than this great institution, the permanent International Association of Road Congresses.

Mr. Chairman, I wish to offer you the thanks and appreciation of the Chinese delegation for the courtesy and assistance accorded them by the President, the Secretary General, and all the executive officers of the American Organizing Commission. Thank you. [Applause.]

Mr. GUSTAV HERMANN (Czechoslovakia, speaking in French). Mr. President, ladies and gentlemen, in the name of the Czechoslovakian

delegation I have the honor of addressing our sincerest thanks to the President and to the other officers of the Congress, and to congratulate them upon the results obtained, thanks to the efficiently conducted discussions in which we have taken part. In addition I address my warm thanks to the representatives of associations and companies and other eminent American personages who have given us such a friendly reception.

The Czechoslovakian engineers will retain forever the happiest remembrances of the days they have passed in this celebrated and marvelous city of Washington. [Applause.]

Mr. SOREN ELLERT (Denmark, speaking in English). Mr. President, ladies and gentlemen, on behalf of the delegates from Denmark, I am entrusted to say a few words and bring forward our thanks at the close of this successful International Road Congress, the first outside Europe.

In saying good-by, we at least would like to say that we want to come over here again to be able to follow the great development in roads, and all road questions here being performed.

The State of Denmark is only little in size to be compared with the United States of America—a child against a giant; but it is said that from children you may hear the truth.

From my experience over here, after three visits, one long and two short, I can state that here you can learn what work really is, and here you can find scientific, trained men working passionately.

After these days of indoors discussion, we are now looking forward with great interest to the coming days of practical studies and observations in the field through the different tours arranged on roads where we shall enjoy the charms of the country and the friendly hospitality of the American people.

In finishing, I am wishing the United States continuous good luck for the work at the "road front," and thanks to all of you American engineers from East to West, and North to South. [Applause.]

Mr. P. J. OTT DE VRIES (Dutch East Indies, speaking in English). Mr. Chairman, ladies and gentlemen, on behalf of the Dutch East Indian delegation, I have the honor to inform you that we are obliged in this closing session to trouble you for some minutes, because the country we represent is in a special condition.

Twenty-five years ago, when I was sent by my Government for the first time to the United States in order to study the wonderful irrigation system in the western part of the federation, I was struck by the words in which the late President Roosevelt (of whom we Dutch people are always very proud, because he was of Dutch origin), had announced in his first message to the Congress on

December 3, 1901, the construction on a large scale of irrigation works. President Roosevelt said in this message, among other things: "Nothing could be more unwise than for isolated communities to continue to learn everything experimentally, instead of profiting by what is known elsewhere."

In our opinion, these words can now be fully applied to the construction of roads in the Dutch East Indies.

Holland is a small country, with only 7,000,000 inhabitants; but the Dutch East Indies, the Greater Holland between the Indian Ocean and the Pacific, has an area which is sixty times larger than that of Holland; that is, four times the area of France, and has a population of more than 45,000,000 inhabitants.

Therefore, in the construction of roads in the Dutch East Indies, we are facing a very difficult task, and that is why every one of you who will assist us in that work will be very welcome.

This word of welcome includes at the same time the heartiest thanks for all who made the Sixth International Road Congress a success, and especially for the American Organizing Commission.

I thank you. [Applause.]

Mr. J. S. POOL-GONSELL (England, speaking in English). Mr. President, ladies and gentlemen, it is my pleasant duty to make a few observations to you on behalf of the British delegation, and I have also been asked to speak at the same time on behalf of Northern Ireland, the British Dominions, and the British Colonies.

Before I make the few remarks referred to, I wish to draw attention to a matter which occurred some few days ago, when the Congress was so good as to pass a resolution of sympathy with the British Nation in the loss of the airship, *R-101*, and we undertook that we would telegraph to the Government the kind resolutions of the Congress. I am glad to say that I have now heard from His Majesty's Government and I think he would wish me to read the reply which has been received from the British Embassy:

I am directed by His Britannic Majesty's ambassador to inform you that His Excellency has now received a telegram from Mr. Arthur Henderson, instructing him to express on behalf of His Majesty's Government in the United Kingdom and of the British Nation, sincere gratitude for this kind message of sympathy in the terrible disaster which overtook the British airship *R-101*. You will no doubt wish to inform the Congress of His Majesty's Government's deep appreciation of their action.

With regard to thanks of all the representatives whom I now represent at this moment, I do not propose at this late hour to do more than accept as my own every word which has been said by the previous speakers in the way of thanks for all the kindness which we have received here from the United States. They have expressed it in much more eloquent terms than I could hope to do.

I propose with your permission to detain you just for one minute on a few points which occur to me to be outstanding at this Congress. First, the number of countries represented, having regard for the large distances which had to be traveled in many cases. The second, the serious, very serious manner in which the subjects were debated; and third, the amount of work which you have got through, and indeed I think as much work was done outside as inside. Further, there was an extreme desire to compromise, in which the various delegations were greatly assisted by the General Reporters.

I should like also to say one word with regard to the new interpreting methods, which have been a great success. But I am wondering quite whether it is an entirely unmixed blessing, because it saves very nearly two-thirds of the time which otherwise would be spent, and speaking for myself the time spent at these Congresses which we have to spend in our association with our kind hosts is quite short enough as it is, and I do hope the effect will not be that we shall have shorter time to get to know each other in the future.

But in addition to the advantages which we have received from the discussions here, we shall have the advantage of viewing the traffic world, both here and on the splendid tours which have been arranged.

In conclusion I desire to offer the thanks of the British Delegation, and to compliment the General Reporters, the interpreters, and last but not least the general staff for their courtesy and continuous attention.

We regret that the United States is so far from Europe that it makes it difficult for us to meet as frequently as we should like to do. [Applause.]

M. COLSON (France, speaking in French). Mr. President, ladies, and gentlemen, permit me to express in the name of the French delegation our thanks to the American Organizing Commission. It is not a simple formula of politeness, but it is from the bottom of our hearts that we are grateful to the American Commission for the manner in which it has organized, conducted, and at last happily terminated the Sixth Congress. Even if the language might fall short of providing proper words for our thoughts, it would suffice me to say that the name of our President, Mr. Chapin, and the name of our Secretary General, Mr. MacDonald, will remain, for the entire French delegation, the names of two friends whom we will hope to see again as often as possible.

I mentioned at the opening session the interest which France attaches to this Congress. I now present a few figures to explain this more precisely. France has a population of 40,000,000 inhabitants, upon a total area of 600,000 square kilometers. The road

system comprising all the roads regularly maintained numbers 600,000 kilometers, or an average of one kilometer of road per square kilometer of area. The system of national roads maintained by the State from State funds, was until now 40,000 kilometers. The Government having understood the particular importance of the road system has passed a law increasing this figure to 80,000 kilometers, thus doubling the importance of the French national road system. The figure of the credits appropriated for this work will reach in 1931 about 1,000,000,000 French francs. Additional expenditures to be made for the reconstruction and improvement of all roads will be about 5,000,000,000 francs.

In France there are 1,000,000 automobiles this year (1930). In addition 400,000 trucks and busses, or a grand total of 1,400,000 automotive vehicles. The number of inhabitants per automobile is 29. This figure is still small in comparison with the ratio in the United States, but it is among the most important of Europe. Certain departments in our country reach the figure of one automobile per 17 inhabitants.

It is because of this exceptional importance which we attach to the question of roads that we have come here in such numbers, convinced of the advantages which we shall be able to draw from the information, the studies, and the new ideas resulting from our visit, from our Congress, and from all that we shall see during our trip to the United States.

At the beginning of our visit, we were impressed by the atmosphere of friendly sympathy here in the United States. The reality has far exceeded our expectations, and we have all been struck by the breadth of view, by the dignity and the cordiality which have been shown in all the meetings of this International Congress. This indicates also the high quality and the importance of the delegates from all nations, and the French delegation is happy to express its admiration of all these delegations. The French delegation rejoices particularly at this union of all the engineers here present, working for the same idea, toward a goal which has been so remarkably exemplified in the territory of the United States, in this great and magnificent city of Washington. [Applause.]

Dr. ULRICH STAPENHORST (Germany, speaking in German). Honored President, ladies and gentlemen, I have the honor to thank the United States Government, the Permanent International Commission of the Road Congresses, and all others who have helped in carrying out the Congress, in the name of the German delegation and on behalf of our country, for the friendly reception which we found here. The Swiss and Austrian delegation also join heartily in these thanks, as they have asked me to say.

We have had opportunity to marvel at the excellent organization as a whole and in detail. To this we owe the fact that the discussions, with the earnest and material assistance of all nations assembled here, were so useful in the further development of road building. There is no doubt but that we have taken an important step forward in these busy days toward the goal which the Permanent International Commission has set itself.

(Continuing in English.) Last, but not least, allow me to express our most sincere thanks for the unanimous approval by all the delegations that the next Congress will be held in Munich, Germany, during 1934. This gracious act gives us confidence and inspires us with the hope that you will be pleased to come to Germany. We shall try our utmost in preparing for the Seventh Congress to see that it may be worthy of the kind faith which you have shown us in favoring us with it. I hope that it is only in that manner that we shall be able to live up to the high prestige established through the preceding Congresses and the excellent event that was organized here, in Washington.

Consequently, it would be wrong to say "good-by." Allow me, therefore, in visualizing Munich as our next place of getting together simply to express the wish, "Auf wiedersehen!" [Applause.]

Dr. MICHELLE CARLO ISACCO (Italy, speaking in French). Mr. President, ladies and gentlemen, the departure of the chief Italian delegate, Senator L. Luiggi, called back to Europe by other duties, gives me the honor of addressing our warm and sincere admiration and gratitude to the Organizing Commission of the Congress and especially to the President, Mr. Chapin, and to the Secretary General, Mr. MacDonald, to the chief authorities of the Government and to the great public and private institutions such as the American Automobile Association, the Road Builders' Association, and the Highway Education Board.

Our admiration of the orderliness and the perfect functioning of the Congress and of what we have already seen of road work and equipment, will assuredly increase in the tours of inspection to which we have been courteously invited.

But our gratitude could not be more profound, since it already touches its maximum. I like to think of the words of welcome which Mr. Chapin and Mr. MacDonald addressed to us at the beginning of our meetings: "We are a friendly and a homely people. Please make yourselves at home." Well, we can say that not only have we made ourselves at home but that we have truly felt at home from the very first moment of our visit and that each day we have felt it more sincerely.

And this is not only because of the frank and friendly character of your kindness and your care, but also because in this noble Capital of Washington we have found again images and emotions which are dear and familiar to our hearts: and we have understood and admired not only the material and economic strength of America, but also the spiritual and moral eminence of this people which amid a formidable mechanism of business and of work, keeps alive the flame of beauty and of the simplest and purest ideals. [Applause.]

Mr. W. G. C. GELANCK (Holland, speaking in English and in French). Mr. President, ladies, and gentlemen, at the end of this Road Week at Washington, which week is standing under the sign, or three signs of the letter "S"—study, sight seeing, and society amusement—I wish to bring the thanks of the Dutch members present here for all that they have received from you Americans, that they have received from your Government, and from your corporations and committees—not to forget the Ladies' Committee.

I will report all this to my Government and I promise you that these Washington days will stay forever in my memory, and with that memory I will see before my eyes always the "new road" you have constructed this week, the ideal road from old Europe to here. As I see this ideal road there is one track for the vast automobiles of engineering science: the second track for the automobiles with the goods of the peoples of the world: and then the third track—a brand track—with autobusses carrying all of the goods of fellowship of all the nations.

Gentlemen, I hope that this ideal road will stretch over the waves forever, and that the traffic, especially of the last track I named, will be more and more intense.

Mr. President of Permanent International Association of Road Congresses (continuing in French), the Royal Government of the Netherlands has followed for 22 years the deeds of this association and it highly esteems the results already obtained. It is for this reason that my Government has charged me especially to extend an invitation to hold in Holland one of the future Congresses, that is to say the Eighth Congress. Seven years from now we shall be able to show you a road system in a Province recently reclaimed from the bottom of the sea. The operations at Zuydersee have already laid bare the first portion of this new Province. In September of this year the reclaimed region was still a vast plain of mud, but this we hope will be transformed in six years into a luxuriant countryside, with villages, woods, fertile fields, and roads constructed by the most modern methods. [Applause.]

Mr. ANDREAS BAALSBUCK (Norway, speaking in English). Mr. President, ladies and gentlemen, the delegation from Norway desires

also to express that we are very glad that we made the long journey over the seas to this country and to this Road Congress. And we now are of the opinion that the Congress has been of still more use than we were ready to believe.

An honored delegate said in the first meeting of the Congress that the ideas would go from country to country and from heart to heart. I agree with this delegate: it is not possible to say it in a better manner than he did.

Allow me to express our compliments and our thankfulness. [Applause.]

LUANG PRINYAYOGAVIBULYA (Siam, speaking in English). Mr. President, ladies, and gentlemen, on behalf of the Siamese delegation, I have the honor to express our very sincere thanks to Mr. President, Mr. Secretary-General, the executive committee, the distinguished delegates of all countries, and all the members of the Congress.

We have greatly benefited from your eminent knowledge and experience. We have obtained from this Congress information which will be of great value to our own country.

Mr. President, we beg to express our deepest gratitude to the American Organizing Commission for the great kindness, the royal hospitality and the cordial welcome extended to us.

We are greatly impressed by the wonderfully efficient manner in which this Congress is organized.

We have seen the experiment station of the Bureau of Public Roads this morning, and are very much struck by the thorough manner in which research on road work is being carried out in the United States of America.

We admire your excellent roads, your fine avenues, your delightful parks, your magnificent buildings and artistic town planning.

Ladies and gentlemen, I thank you and wish you all happiness. [Applause.]

Com. AXEL VALSINGER (Sweden, speaking in English). Mr. President, ladies, and gentlemen, in my capacity as the delegate of the Government of Sweden, I have the honor of speaking on this important occasion when the Sixth International Road Congress is nearing its close after having discussed and reached its decisions concerning the important subjects that have been before the Congress.

On behalf of the Swedish members of the Congress, I have the honor of expressing our warmest thanks to our American colleagues who, by arranging this Congress, have afforded us the opportunity of gathering many fruitful experiences and of increasing our knowledge through the study of the high standard attained by the road communication system of the United States of America. The spirit

of progress animating all those who are occupied with the administration of the American road program has been very stimulating to us.

Most especially we wish to thank the President of the Congress, Mr. Roy D. Chapin, and its Secretary General, Mr. Thomas H. MacDonald, for the extraordinary brilliance and skill with which they have directed the Sixth Congress.

Finally, we wish to express our deep gratitude to the American Organizing Commission, and to all our American colleagues, including individuals, corporations, and associations, for having given us such a magnificent reception and displayed such whole-hearted hospitality during the Sixth International Road Congress in Washington. We wish to assure them all that we always shall cherish a warm and abiding remembrance of our visit to the United States of America. [Applause.]

M. PAUL LE GAVRIAN (Secretary General, Permanent International Association of Road Congresses, speaking in English). Ladies and gentlemen, you have just heard the thanks that your selected speakers have so justly tendered to our hosts, and particularly to the American Organizing Commission of the Sixth Congress. Permit me to include especially in these thanks the ladies' reception committee.

At the dinner last night a very eminent speaker stated that in the attendance at the Congress one observed many beautiful ladies; and it is, you know by experience, one charm of our Road Congresses to enjoy the presence of representatives of the fair sex who, after all, have the right to use the roads as much as the representatives of the homely sex.

The American Ladies Committee, whose task has been to receive the ladies in attendance, with so much amiability, to show them the city, and to surround them with every possible attention, has performed a part essential to the success of the unforgettable week we have just passed in Washington.

I desire also to mention particularly our Interpreters at the meetings. The marvelous system of combination-telephones that permits a speaker to make himself understood simultaneously in several languages, is valuable only as the interpreters are competent, attentive and alert. [Applause.]

But we have been most fortunate in that personnel, and we should be very thankful for the part that they have played in the success of this Congress.

And now, ladies and gentlemen, reversing the customary order, I extend to you, yourselves—Congratulations!

At our opening session, I said that beside you, in the rôle of flute players of old, your General Secretary—and myself—should put

you on your guard against the temptations to sacrifice work and play truant in this magnificent and captivating city.

You have listened to our counsels; you have worked hard, and the results of your labors—the conclusions voted at the meeting this afternoon—are the fruits of your effort that the whole world will recognize.

You should then, in all justice, receive on your part also our compliments, and that is why, in closing, I offer you with very great pleasure the thanks and warmest felicitations of myself and of those of the entire Permanent International Commission, and of the management. I thank you. [Applause.]

Mr. THOMAS H. MACDONALD (Secretary General of the Sixth Congress, speaking in English). Mr. Chairman, ladies, and gentlemen. I have one conclusion that I think should be added to the important conclusions which we adopted this afternoon in the interest of all truth and sincerity.

Those of us of the United States have had some beliefs, which we now find to be untrustworthy. It has been my understanding for many years that there was only one Blarney Stone, which existed in Ireland. We have had to-night the proof that there are "blarney stones" existing in at least 20 countries, and I presume if the list had been further extended, we would have been assured of the existence of at least 62 "blarney stones" in the world.

I hope that the blarney stone is as well recognized in some of the other 62 countries as it seems to be in the delegation seated immediately in front of me.

To those of you of the United States who have been the real workers in the organization and labors of this Congress, and whether you are of the official family or outside who have cooperated with the general officers of the American Organizing Committee, I extend the thanks of the whole committee with deep sincerity; and to the delegates I beg leave to extend my remarks upon this phase of the subject in the record, because there are so many that it is impossible within reasonable limits to name them.

To Acting President Chaix, and to Secretary-General Le Gavrian of the International Association, may I extend the thanks of the Secretary-General of the American Organizing Commission for their very kindly cooperation and assistance to us. We have had no word of criticism, nothing but the most enthusiastic support, for all of the attempts which we have made.

And may I suggest that these words of good-by, or "au revoir," or "auf wiedersehen," or whatever the others are, are distinctly not in order this evening because, while we close the sessions of the Congress to-night, it is only the closing of the sessions of school, and now

the scholars will have the opportunity for a vacation in which we will become acquainted, I hope.

I make the prediction that in carrying forward the program which has been outlined for many of you, perhaps the most of you in the audience to-night, in traveling about the East, the West, the North and South of the United States, that you will wish before the end of the 14 or 15 days, that there did not exist such a place as the United States; but when you shall have had an opportunity to become rested on your way home, I hope that you will have nothing but pleasant recollections, not only of the Congress, but the opportunity to become acquainted with us of the United States after the close to these sessions on the trips on which we are now embarking.

And to correct one other statement that has been so frequently made here this evening, may I remark that we are those who are honored by your presence and by the efforts that you have made to reach us and to be with us.

We have made certain facilities available for your use, but you are the ones who have used them and made them successful, and may I add to our German colleague, with all due anticipation of 1934, that the word "Munich" is not unfavorably known in the United States. [Laughter.] It has a certain attraction and drawing power which I feel will receive the same hearty response that you have given to us.

And also, to the members of the Italian delegation, who entertained us only a few years ago, we remember them with the kindest regard and the heartiest thanks, and appreciate the opportunity to return in a small way the courtesies which were extended to us in Italy.

May I not say good-by, or any of the language equivalents, but only good night. [Applause.]

The PRESIDENT GENERAL. I think all of you can understand how deeply we appreciate the many kind things you have said to-night. The American Organizing Commission is sorry the Congress is over. It has been the greatest road meeting ever held in the United States, not only in quality of the delegates who have come from all the world, but in the quality as well of the delegates who have come from our own country, and naturally, as you know, I feel the influence is going to be felt around the world, and going to have great import in the construction of highways in the years to come.

We are intensely happy in your pleasure that you have had in Washington. We are even happier in your friendship.

Yesterday morning, President Hoover inquired of me how the Congress was going. I was very happy to tell him that not only had we the largest delegation from the various nations of the world

that has ever attended any Congress in America, in the United States of America, but that I believe that the deliberations and the results would be as far-reaching as any other Congress ever held in this country.

This meeting could not have been the success that I hope that it has been, if it had not started with the good work done in Europe by your President, Mr. Mahieu, your Vice President, Mr. Chaix, and your able Secretary-General, Mr. Le Gavrian. They helped enormously in the organization of the Congress; Mr. Le Gavrian was here last winter and told us what to do, and we have tried to do it.

Let me take occasion to thank these various people, but also let me express to you as coming from them their genuine thanks for the cooperation which you have given them, the chairmen of the Sections, the Reporters, the Secretaries, the Interpreters, Miss Fuller and the ladies who took care and cooperated in taking care of the ladies who are here at the Congress, the American Road Builders' Association, the American Automobile Association, Mr. Thompson, who is the manager of the Congress, Mr. Fairbank, Mr. James, Mr. Johnson, and I want to tell you very frankly that small praise is due your President, the praise goes to the men whom I have mentioned, and in particular to the last speaker, Mr. MacDonald.

We wish you good luck on your tours. We believe you are going to have a good time.

I shall see you all again, I hope, in Detroit and shall be there waiting for you, and I hope that you will come and see us again next year, to see our roads—I hope you will come every year.

If we do not see you before 1934, we shall all, I trust, meet in Munich.

I thank you [applause] and I declare the Sixth International Congress adjourned.

(Adjournment of final closing session.)



A MEETING OF THE SECTIONS

ON THE PLATFORM, OFFICIALS OF THE CONGRESS—ON THE ROSTRUM, A DELEGATE SPEAKING—BEFORE HIM, STENOGRAPHERS, ELECTRICAL RECORDING APPARATUS, AND INTERPRETERS WITH TELEPHONE TRANSMITTERS—FOREGROUND, PRESS REPORTERS—AT LEFT, DELEGATES LISTENING THROUGH EAR PHONES TO PROCEEDINGS AS INTERPRETED INTO THEIR OWN LANGUAGES

IX. GENERAL CONCLUSIONS ADOPTED BY THE CONGRESS

FIRST SECTION.—CONSTRUCTION AND MAINTENANCE

FIRST QUESTION.—RESULTS OBTAINED BY THE USE OF: (A) CEMENT; (B) BRICK OR OTHER ARTIFICIAL PAVING. (METHODS EMPLOYED FOR ROAD CONSTRUCTION AND MAINTENANCE IN THESE MATERIALS)

1—A

1. Cement is becoming generally used as a paving material and has many *inherent advantages*. *Rapid-hardening cement* has special advantages in particular circumstances.

2. Cement has been used successfully in the construction of cement concrete base courses for other surfaces, for cement concrete pavements, and for cement-bound macadam.

3. Cement concrete pavements and also cement concrete base courses protected by appropriate wearing surfaces are suited to heavy traffic.

4. Where a large volume of steel-tired traffic is encountered, if cement concrete is adapted as a pavement material, a 2-course pavement with the upper layer composed of very hard aggregates should be used instead of a single-course pavement.

5. Single-course pavements have successfully carried maximum volumes of traffic and maximum wheel loads when the traffic was largely rubber tired.

6. Cement-bound macadam has been successful on roads carrying light traffic not inimical to the macadam type of construction. This method seems especially advantageous in locations where the conditions of drainage or exposure are unfavorable to the use of ordinary water-bound macadam. A protective wearing surface seems equally indispensable on cement-bound and water-bound macadam.

7. In designing cement concrete pavements and cement concrete base courses to be surfaced with other materials the resulting pavements should have equal load-carrying capacity or structural strength, when similar traffic conditions are to be met.

8. Competent engineering supervision of design, construction, and maintenance of cement concrete pavements is necessary to insure good results.

9. It is desirable that subgrades be uniform and stable.

10. Pavement slabs must be designed to carry expected loads. Edge thickening is advantageous as a means of producing an economic and balanced structural design for concrete pavement slabs.

11. Longitudinal and transverse joints are commonly used and must be designed to meet traffic, subgrade, climatic conditions, and shrinkage of concrete, but in view of the fact that a number of concrete roads have been successfully constructed without joints, it is advisable that further research should be made on the whole subject of joints and cracks.

12. Scientific design of concrete mixes and weight proportioning of aggregates represent the most modern practice.

13. Construction operations are performed mostly by machinery, with resulting lower cost and better workmanship. The value of a cement concrete roadway depends to a large extent on the perfect execution of the work and, in particular, on the homogeneity of the concrete.

14. Thorough curing of concrete surfaces is essential.

15. Maintenance of concrete surfaces, properly constructed, is relatively simple and reasonable in cost. In particular maintenance should comprise immediate filling with suitable material of the expansion joints and of any cracks which may occur.

1-B

Brick paving.—Subject to suitable foundation, brick will make satisfactory paving for light, medium, or heavy traffic according to the country in which it is used.

Specifications and tests for paving bricks should be prepared and submitted to the next Congress, with a view to standardization.

Rubber paving.—Rubber block paving has had limited application so far. It is, however, a silent paving and suitable for certain positions in large towns.

Research should therefore be continued in the following directions:

- (a) Most suitable quality of rubber for street paving.
- (b) Most suitable type of block and method of laying.
- (c) Production and method of application of a suitable joining material.
- (d) Reduction of costs.

SECOND QUESTION.—THE MOST RECENT METHODS ADOPTED FOR THE USE OF TAR, BITUMEN, AND ASPHALT IN ROAD CONSTRUCTION

1. Tar, bitumen (asphaltic bitumen), and asphalt are suitable materials for use in the improvement of all classes of roads, subject to the limitations imposed by the characteristics of the material, the

intensity of traffic, and local physical conditions. It is especially desirable to note the extended use in recent years of superficial coatings, in particular those effected with emulsions. Certain governing conditions generally recognized are:

(a) The use of the correct grade and amount of bituminous binder for the particular type of work and aggregates to be used.

(b) Suitable aggregates, correctly graded.

(c) Provision for prompt maintenance. When the foundation is adequate and when the surface can be maintained at reasonable cost, an advantage of the types of roads built with these materials is that they can be kept in good condition by maintenance of the surface without the need of extensive repairs to the foundation.

(d) Proper proportions of the constituent materials, thorough mixing and thorough compacting.

(e) Competent technical supervision of design, construction, and maintenance.

(f) *Slipperiness*.—Attention should be given to the reduction of slipperiness. In some cases valuable results have been attained by the following methods:

(1) Adoption of suitable compositions containing the maximum permissible proportions of large aggregate.

(2) The rolling of plain or precoated chippings into newly laid surfaces.

(3) The use of minimum practicable camber of surface and proper degree of superelevation on curves.

(4) Treatment of existing surface with a suitable surface dressing compound, covering with coarse hard chippings, and rolling.

2. The need for research into the fundamental factors involved in the use of tar, bitumen (asphaltic bitumen), and asphalt in road improvement and maintenance is recognized. The attention of the members of the Congress is especially directed to needs as follows:

(a) Research into the constituents and characteristics of bituminous materials and their combinations with other materials with proper study of their application in the treatment of earth roads.

(b) Improvement of mechanical equipment for use with these materials and their combinations with mineral aggregates.

(c) Research into factors affecting the durability and serviceability of roads, such as climate, subsoil, traffic density, and road design.

(d) Data on economic factors, such as—

(1) Cost of transportation over various road types, including vehicle operation costs and roadway costs, with proper study of their application in the treatment of earth roads.

(2) Relation between maintenance costs and intensity of traffic for various road types.

3. In order that mutual understanding and helpfulness may be promoted, there is need for an international classification of materials, combinations of materials, construction methods, and road types which will correlate the terms in use throughout the world, both commercial and scientific.

THIRD QUESTION.—THE CONSTRUCTION OF ROADS IN NEW COUNTRIES, SUCH AS COLONIES AND UNDEVELOPED REGIONS

1. It is desirable, in the first place, to form a central body with legal authority to coordinate and assist in the general planning of the road communications of a country and the acquisition or reservation of necessary land.

2. The perfection which has been attained in the building of automotive vehicles often permits highways to render service in the exploration and development of new territories which formerly could be rendered only by railways.

3. The highway has over the railway the advantage of allowing the expense of construction and maintenance to be made proportionate to the importance of the traffic to be served. The present-day automobile being able to run on very difficult roads, at the beginning we can establish simple trails by nothing more than a primitive working over of the natural soil, the structures which are necessary being only those over permanent watercourses which can not be forded. The road will ultimately be improved by the construction of a roadway provided with an appropriate surfacing, and the construction of structures for crossing streams and valleys in proportion as the development of traffic makes available new resources for the execution of the work.

4. Adequate land should be acquired to provide for the eventual and ultimate expansion of the traffic as far as can be foreseen.

5. Before any actual construction is begun it is essential that the general highway layout should be prepared with due regard to the ultimate requirements of the permanent road system.

6. In countries of low density of population and where the construction of a large mileage of roads adequate even for light traffic is limited by the scarcity of available funds it is deemed advisable to adopt the progressive system of construction by stages. Every endeavor should be made to insure that the initial alignment, grading, and subsequent surfacing should be such that all work executed should be capable of being utilized in the ultimate development of the road structure.

7. In the first instance the actual traveled way should be so constructed as to be passable for motor traffic, but as economically as possible.

8. Locations in cut should be avoided when they have disadvantages from the point of view of drainage, and light fills are to be preferred.

9. Where traffic is light in numbers and unit weight, earth roads have proved economical and satisfactory, but to conserve the surface of such roads until they can be improved, it is essential to restrict the weight per unit width of tire and speeds of individual vehicles to such an extent as may be necessary to prevent undue erosion or disintegration of the road surface.

10. For the establishment of roadways a width of 3 meters per traffic lane should be required. On structures a width of 3 meters, or even multiples of 3 meters, should be reserved for traffic.

It is recommended that from the beginning, 2-lane roadways be provided on important structures, at least in so far as the foundations are concerned.

11. Uniformity of design throughout the length of a location should be attained by avoiding heavy grades and sharp curves in stretches of road which in general do not contain them.

12. Some tests of mechanical grading of the roads have been made in desert regions; it is desirable that these tests be continued.

13. It is desirable also that systematic research be undertaken to determine the physical properties of mixtures of clays and sands which constitute the natural soils, including soils containing hygroscopic salts, with a view to collecting useful data for the construction of earth wearing surfaces, appropriate for economic service in little developed regions having available few resources.

SECOND SECTION.—TRAFFIC AND ADMINISTRATION

FOURTH QUESTION.—WAYS AND MEANS OF FINANCING HIGHWAYS: (A) ROAD CONSTRUCTION; (B) MAINTENANCE

1. The motor vehicle with increasing use creates demand for large expenditures for reconstruction and improvement of existing highways to new standards, construction of new highways and effective maintenance of all improved highways. It justifies such expenditures through improved economy and efficiency of transportation, especially within areas previously served by highway transport and through extension of economic, commercial, and social access to new and wider areas.

2. No country has as yet approached completion of its major highway system to the new standards and ~~the~~ countries face heavy de-

mands for greater attention to accommodating their secondary and local roads to the needs of motor traffic. Though differing widely in character and degree in different countries, the problems of highway finance are universal and urgent.

3. To meet the large financial problems involved and to secure the fullest and quickest benefits from the new form of transportation, it is specially important that highway programs covering a period of years be set up well in advance and carefully budgeted. Adjustments to meet changing conditions and improved methods can readily be made as developments may require.

4. To facilitate financing and administration, and as a guide in determining the kind and extent of improvement, all highways should, as far as practicable, be classified according to the characteristics of their prevailing traffic as to origin, destination, and importance. Classifications usually applicable are:

(a) General use highways (including urban streets which form part of such highways):

(1) Primary or national highways.

(2) Secondary, departmental, provincial, or, in countries of smaller geographical area, county highways.

(b) Highways of local interest:

(1) Local roads.

(2) Urban streets (except as indicated in subparagraph (a) above).

(c) Special highways—military roads, autostrades, etc.

The first group includes the highways of general use—i. e., highways which receive traffic from a number of local roads or from a city or town and carry a considerable proportion of traffic into or through more than one rural jurisdiction. Every public highway should be definitely assigned to the appropriate class and responsibility therefor be fixed upon the authorities of the proper political unit.

5. In countries of vast area and sparse population, financial limitations and traffic needs may direct primary attention to early development of minimum all-year standards of highways of secondary or local character, to give access to rail or water transport lines. As highway development progresses, however, such secondary and local systems tend to integrate and through routes become identified, with consequent demand and financial justification for higher type construction. It is important in the interest of ultimate economy that the requirements of the future main highway systems be considered in planning earlier highway development.

6. To promote efficiency of programing and administration, highway authorities of higher jurisdictions should have supervisory or

advisory relationship to the lower jurisdictions. The granting of subsidies or loans by the national to the lower jurisdictions under suitable conditions is an effective means of exercising the desired influence and of assuring financial possibility of carrying out highway programs in charge of lower jurisdictions having aspects of national concern, including special attention to undeveloped sections.

7. Provision for systematic maintenance of all highways after improvement is an essential feature of a sound highway program. If proper types of highways in relation to the character and volume of traffic are provided, maintenance costs should be less than with inadequate highways handling the same traffic. In making provision for maintenance, however, it should be borne in mind that traffic on improved highways tends to increase rapidly and, while the improvement thus benefits the users, it may increase the total of maintenance costs. For this reason maintenance of improved highways of general use, or at least any increase over the former normal maintenance costs, should be regarded as a first charge upon the user revenues.

8. The cost of constructing, improving, and maintaining adequate highways systems should be distributed equitably in relation to the direct and indirect benefits derived, taking into consideration the taxable capacity of those benefited. Wide difference of conditions and institutions in various countries makes it impossible to establish any fixed formula for general application but certain conclusions based on recent trends can be stated:

(a) Due to the benefits to society, business and property in general, the application of general tax revenues to highway purposes is desirable and should continue, the amounts being dependent upon the needs for highways, the funds available and the demands for other purposes in the public budget. General taxes, carrying as they do a direct accountability to public opinion for efficient expenditure, are a particularly appropriate source of revenue for work on local roads, including urban streets.

(b) Any assessment of abutting or other benefited property, chiefly in urban districts and their environs, should be proportional to the actual benefit to such property.

(c) Up to the limit where they become an undue burden upon users of the highways, user taxes, including license fees and fuel taxes, afford an important and increasing source of highway finance. If such taxes are made unduly high, or if the burdens upon vehicle owners are unnecessarily increased by excessive import duties in predominantly agricultural, nonmanufacturing countries, they tend to bring to bear the law of diminishing returns as well as deprive the public of the benefits of normal development of motor transport.

tation. For the same reasons user taxes should be applied exclusively for highway purposes. To provide uniformity over reasonable areas they should be imposed only by rules fixed by one of the higher jurisdictions. To maintain the sense of responsibility for collection and expenditure, they should in principle be expended under supervision of the collecting unit of government, and, at least for the present, only on highways of general use (including the sections thereof within municipalities).

9. Because of the prevailing inadequacy of financial resources to permit prompt completion of highway systems corresponding to the economic requirements of motor transportation, and because of the investment character of improved highways from which, experience shows, increasing returns in the form of user taxes may be expected, bond issues or other methods of borrowing for highway construction and improvement are desirable in most countries. Such bond issues should, however, be limited to actual requirements for economically justified construction or improvement projects, under sound administration and with subsequent maintenance provided for out of current revenues. The bonds, if based primarily on user revenues for interest and redemption, which according to experience can be fully covered by such revenues under favorable conditions of highly developed motor transport, should nevertheless be backed by the full credit of the unit of government concerned. The period of amortization of loans for highway construction should not exceed the life of the improvement. When the needs for expedited highway construction and improvement have been met, the use of bond issues should be discontinued and the pay-as-you-go basis followed, especially when capital expenditures recur in each annual budget.

FIFTH QUESTION.—HIGHWAY TRANSPORT: CORRELATION AND COORDINATION WITH OTHER METHODS OF TRANSPORT; ADAPTATION TO COLLECTIVE (ORGANIZATIONS) AND INDIVIDUAL USES

1. Highway transportation has in the last decade become firmly established in the general scheme of transportation in the important and progressive countries of the world. The people and government agencies of the several countries are beginning to investigate the possibilities of the coordination in the movement of persons and commodities by highway on the one hand and by rail, water, and air on the other. The coordination between different systems of transportation by land, by water, and by air should be so arranged that every transport should be done, as far as possible, through the most economical way and that most fitted to the particular needs. In this matter, the public authorities should adopt such legal and

fiscal regulations so as not to disturb the natural economic conditions of each transportation system.

2. The coordination of rail and highway transportation is the more pressing problem.

3. The development of highway transportation through the use of the motor vehicle has not been of equal intensity in all countries. To the degree that this development has gone on in a country, to that extent has the problem of the coordination and correlation of highway and rail transportation facilities become the more pressing in its demand for a solution based upon broad economic and scientific principles so that the public as a whole may enjoy the maximum benefits of all its transportation agencies.

4. Transportation by highway and transportation by rail are partly complementary and partly distinct services. Each one must be judged on its own merits. The considerations which govern the one are not the same as the considerations which govern the other. One can not be placed in a subordinate position as compared with the other.

5. In considering this problem of coordination it must be recognized that common carriers of both passengers and freight constitute but a very small part of the total highway traffic. In general, private automobiles form the most important part of highway traffic and it is they which compete most seriously with the railways in passenger traffic. Where such a condition occurs public authorities should permit the railways to adjust their train schedules so as to reduce passenger train-miles as much as possible. Railroads find it advantageous to substitute, for unprofitable trains, busses operated by them or others.

6. The operation of all public motor omnibus services, irrespective of ownership, must be subject to adequate control by a responsible authority embracing a wide area so as to insure regularity, efficiency, and adequacy of service, safety of the public at large, and avoidance of excessive competition and uneconomic fares.

7. In certain situations it is found that the small amount of traffic that highway common carriers might draw from the railways is largely compensated by the feeder service which they afford to main lines of railroads. This is especially true in mountainous countries where railway construction is extremely expensive. There the automobile, by superseding the old and slow means of transport, has brought about a revolution in traffic and has caused such regions to be better developed industrially and commercially.

8. In considering the various proposals for a closer coordination between rail and highway carriers, one or more of the following three plans is usually followed:

(a) Voluntary cooperation between railroad companies on the one hand and operators of busses and common carrier trucks on the other.

(b) Inauguration of highway transport services by the railroad companies or financial and administrative control or participation exercised by these companies in the conduct of highway transport undertakings.

(c) Quasi-legal coordination with obligation placed on the different transport companies to agree to the creation of a system of cooperative operation and in case agreement is not reached the enforcement of compulsory coordination by governmental authority.

9. Automobile and bus operation, as well as motor-truck operation, produces new traffic, part of which the railroads could not handle, and is enormously helpful in shipments of less than carload freight by introducing new methods of containers, and helping to solve the problem between terminals in large cities. The passenger traffic created is both short and long haul, but the motor-truck traffic is, in general, short haul. It must be observed, trucks operating over good highways act as agencies for gathering freight which serve to increase the productivity of the farming areas and relieve the railways of short-haul freight upon which little or no profit could be made.

10. Common-carrier truck operations, as a whole, have not been profitable due to the competition of private and contract trucks. Common carriers of freight on the highways handle such a small part of the total traffic that the field does not appear sufficiently attractive for railways as a general proposition.

11. Traffic surveys, including studies of origin and destination of traffic, are of special value in revealing the true characteristics of various kinds of motor traffic and their relationship to other forms of transportation, whether as feeders thereto or supplementary thereof.

12. Highway transportation enterprises should be financially self-sustaining. Monetary subsidies on the part of the State or of private interests should arise only in the opening up of certain regions or sections of country which are destitute of traffic. Otherwise, the motor vehicle should be in position to bear its own expenses and taxes in so far as they may be considered fair to the motor vehicle. This is true in particular with reference to the contribution for the maintenance of roads which the motor vehicle makes by the payment of motor-vehicle taxes, including gasoline taxes or duties.

13. Taxes for highway purposes should be borne not only by motor vehicles but by all interests which benefit from the highway

system, and should not be such as would arbitrarily prohibit the use of highways.

14. Cooperation between railroads and automobiles, which has already been effected to some extent, is one of the great requirements of the age. In seeking such solutions, the needs of aviation, the provision of airdromes and roads leading to them, must not be overlooked.

15. It is desirable for the convenience of the traveling public that there should be standard dates (with the minimum of exceptions) for new time schedules in public-road services, and that there should be universal as well as regional roadway time-tables.

16. The Congress, considering that the question relative to the co-ordination of the various methods of transportation has received formal consideration at the International Congress of Railroads held in Madrid, May 5-15, 1930, under the title "Competition Between Automobile Transportation Systems and Railroads"; not being able to proceed to the thorough study required by an examination of the conclusions of the Madrid Congress—

Resolves, That hereafter, the question of establishing coordination and harmony between the various systems of transportation by road, by rail, by waterways, and in the air, be considered by the various international congresses that may be called upon to deal with it, and that reports be prepared by joint commissions of the accredited representatives of these various systems of transportation.

SIXTH QUESTION.—1. TRAFFIC REGULATION IN LARGE CITIES AND THEIR SUBURBS; TRAFFIC SIGNALS; DESIGN AND LAYOUT OF ROADS AND ADAPTATION TO TRAFFIC REQUIREMENTS IN BUILT-UP AREAS. 2. PARKING AND GARAGING OF VEHICLES

1. The Congress confirms in general the conclusions of the Congress of Milan on the fifth question relating to the layout of cities with regard to convenience and safety of traffic.

2. With respect to traffic signs and signals the Congress urges the necessity for uniformity and adherence to the principle that shape and color shall be utilized to give indications.

(a) The Congress recognizes the recommendations of the diplomatic conference held in Paris in 1926 and set out in Bulletin No. 57, May-June, 1928, as an important step toward this end, and it proposes that countries that have not accepted these recommendations should, in designing systems of signs, give due consideration to the principles contained in that bulletin. And the Congress further proposes that an international committee be named by the Permanent Commission and the executive bureau of the Associa-

tion of International Road Congresses to consider methods for the universal application of the principles contained therein.

(b) It is further recommended that the same international committee undertake to propose uniform standards for traffic control signals and other control devices. Pending the establishment of such standards it is recommended that the color red, in traffic-control signals, be used only for the purpose of stopping traffic; for other traffic indications, such as those marking obstructions in the roadway, the color red may still be used to indicate caution.

3. The Congress recognizes that the design of rules and regulations for the facilitation of traffic in congested districts is a problem of growing complexity and that specific control measures should be applied only after a competent study of local conditions by qualified officials and the cooperation of interests affected. Under suitable conditions the following types of regulations have been found useful:

(a) Parking restrictions through the application of space and time limits or prohibitions.

(b) Segregation of types of traffic through the exclusion of certain classes of vehicles.

(c) The regular alignment of vehicles en route through the use of traffic lane markings.

(d) One-way movement.

(e) Rotary movement at intersections where center islands of sufficient size and adequate visibility to permit easy rotation can be reserved.

(f) Control of turning movements at intersections and of U turns between intersections.

(g) Pedestrian regulation.

4. The Congress recognizes the physical and financial difficulties involved in replanning congested and built-up districts in large cities. It believes, however, that substantial relief can be obtained through changes looking toward the adaptation of streets in such districts to the requirements of modern traffic. Among such adjustments are the following:

(a) Where economically possible, public rail carriers should be removed from the street surface in such districts and placed in subways, or rapid transit, or forms of transportation offering a minimum obstruction to traffic should be substituted, thus providing improved transportation, and an increase in general traffic capacity.

(b) The passage of pedestrians across heavily traveled streets can be facilitated and protected through the construction of subways or bridges at street intersections or other natural places of

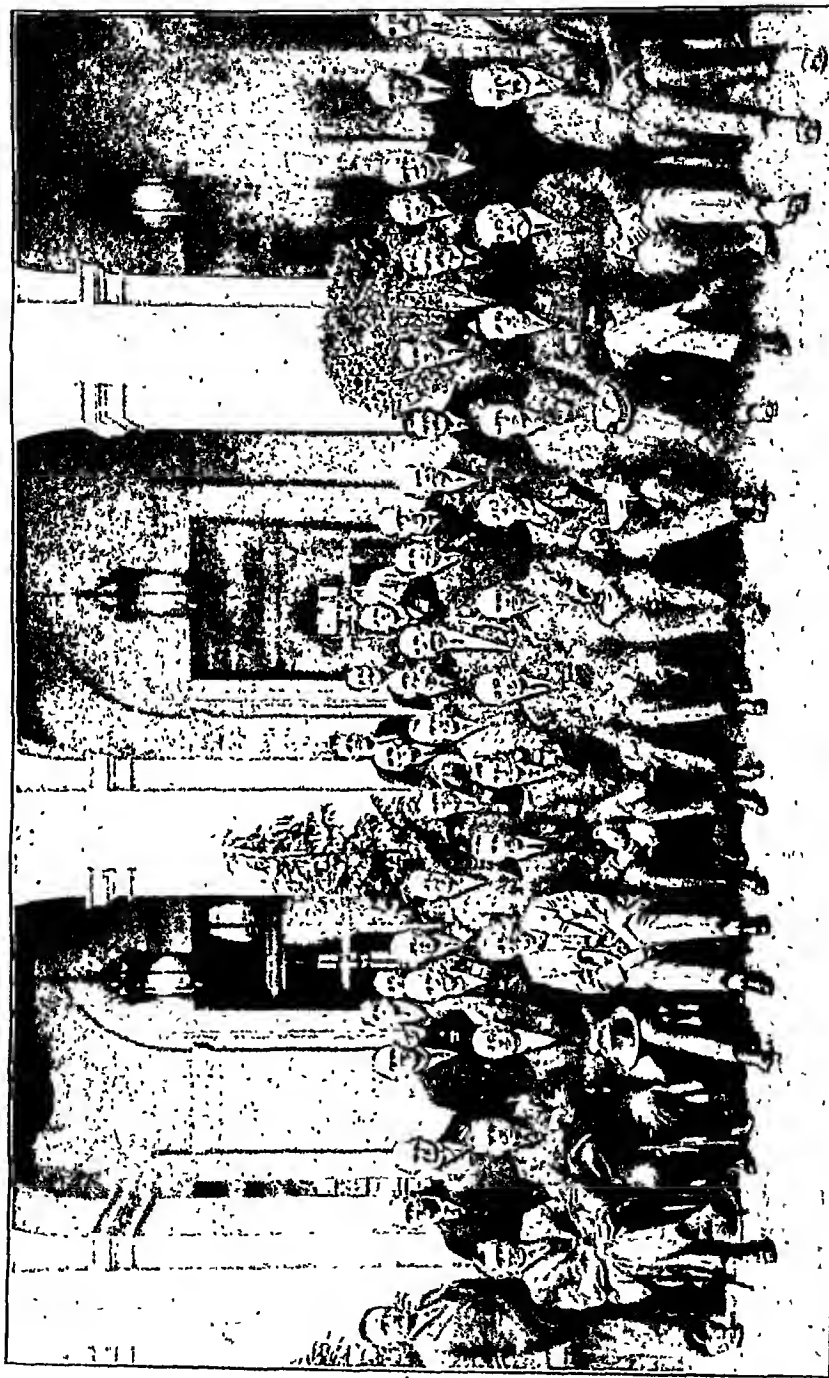
crossing. In certain districts it may be desirable that such subways or bridges be sufficiently close together, so that any crossing of the street surface by pedestrians will be rendered unnecessary. Where traffic is not sufficiently heavy to warrant such structures, pedestrian traffic can be facilitated and protected by the use of definitely marked lanes at street intersections and other natural places of crossing.

(c) In order that prohibition or progressive restriction of parking may be applied without undue public inconvenience or economic hardship, encouragement should be given to the provision of offstreet storage space, economically and conveniently available. The Congress holds that in certain cases it may be proper to require in the construction or remodeling of buildings, the incorporation of suitable space for the offstreet loading or unloading and garaging of vehicles.

(d) The Congress holds that traffic congestion and the resultant risk of accidents as well as economic losses are sufficiently great in certain instances to warrant consideration of expenditures for the construction of grade separation at intersections and indeed for the construction of elevated or underground streets.

5. As regards sections of the city in process of development, and suburban zones destined for future development, the Congress urges the application of broadly conceived plans for their layout in order that the future may not result in a repetition of the difficulties now experienced in congested districts.

6. The Congress holds that highway officials should give due regard to the amenities of the roadside and should be given such powers as may be necessary to give reasonable protection in connection therewith to highway safety and the recreational value of the road.



PERMANENT INTERNATIONAL COMMISSION

X. SPECIAL RESOLUTIONS ADOPTED BY THE CONGRESS

NATIONAL COMMISSIONS TO ASSIST PERMANENT INTERNATIONAL COMMISSION

Sr. Juan Agustin Valle of Argentina proposed the following resolution at the plenary session of Friday afternoon, October 10:

In order to supplement the efficient work being carried out by the Permanent International Commission of Road Congresses, the Sixth International Road Congress held in Washington resolves to request the governments represented in this Congress and adhering to the Permanent International Commission of Road Congresses in Paris, that they should each appoint a national commission which will cooperate with the Permanent International Commission in its important campaign for the improvement of roads throughout the world.

The resolution was seconded by Dr. Mau Sun of China. Remarks in support of the resolution were made by M. Paul Le Gavrian, Secretary General of the Permanent International Association of Road Congresses; Mr. J. S. Pool Godsell of England; Mr. Roy D. Chapin, President General of the Congress; Mr. Thomas H. MacDonald, Secretary General of the Congress; and Dr. Ulrich Stapenhorst of Germany.

The resolution was unanimously adopted by a rising vote.

LARGER APPROPRIATIONS URGED FOR HIGHWAY PURPOSES

M. Edmond Lorieux of France proposed the following resolution at the plenary session of Friday afternoon, October 10:

The Congress resolves that the attention of the public authorities be drawn to the present importance of the road problem, and to the benefit which would result to them in consecrating for the improvement of road systems, more and more important sums.

The resolution was seconded by Dr. Julio C. Borda of Argentina, and was unanimously adopted by a rising vote.

TRIBUTE TO VICTIMS OF R-101 DISASTER

At a joint meeting of the two technical sections of the Congress on Tuesday morning, October 7, a minute of silence was observed in tribute to the victims of the *R-101* dirigible disaster.

M. Edmond Chaix, Acting President of the Permanent International Association, expressed the sorrow of the Congress in appropriate words, and following the minute of silent mourning, Maj. F. C. Cook responded in the name of the British delegation.

RESOLUTION OF SYMPATHY TO DOMINICAN REPUBLIC

Sr. Enrique Coronado Suarez, of Colombia, proposed the following resolution at the closing session of the Congress on Friday evening, October 10:

The Sixth International Road Congress, considering that at the time this Congress is assembled, one of the American nations, birthplace of the civilization of the New World, is suffering the consequences of a great calamity that has covered its ground with tombs and ruins, and has filled the heart of the people of America with sorrow; considering that the Dominican Nation was the first link between the civilization of the old and the new world, that there was founded the first city of the Western Hemisphere, that there were established the first colonial institutions, that from there the navigators departed on voyages of discovery which incorporated a new continent into the world civilization; considering that the memories of an illustrious past give to the Dominican Nation claims to the gratitude of America and, in fact, to the whole world, and that the magnitude of its misfortune and the serene courage with which it has borne its adversity have awakened feelings of sympathy and admiration throughout the world;

Be it resolved: That sentiments of the profound grief of the distinguished delegates to this Congress be put on record, and their sincere wishes be extended for a speedy rebirth of the prosperity of the noble Dominican Nation and the happiness of its people.

The resolution was seconded by Sr. Francisco J. Sucre, of Venezuela, and by Col. A. B. Barber of the United States. It was unanimously adopted by viva voce vote.

APPRECIATION TO DOCTOR GUGLIELMINETTI

Sir Seymour Williams of England, at the request of Colonel Crosby of the United States, who had been summoned away from Washington, read the following message at the plenary session of Friday afternoon, October 10:

We have discussed whether tar or asphalt or bitumen or other materials will be the best solution of road treatment, but as yet we do not seem to know. We realize that they all give good results. But we do know that a man among us has directed the attention of the world to the use of tar and the study of similar road materials. He is Doctor Guglielminetti, who founded 25 years ago the first antidust league.

Colonel Crosby desires to suggest that you all agree to extend a vote of appreciation on this auspicious occasion to Doctor Guglielminetti.

The resolution was seconded by Sr. Juan Agustin Valle, of Argentina, and was unanimously carried by a rising vote.

XI. RECEPTIONS AND EXCURSIONS IN AND ABOUT WASHINGTON

AMERICAN AUTOMOBILE ASSOCIATION LUNCHEON

A luncheon was tendered official delegates and members of the American Organizing Commission by the American Automobile Association at the Willard Hotel on Wednesday, October 8. Added significance was given to this event by the presence of outstanding leaders in the automotive industry, who evidenced their interest in road building throughout the world. These included: Charles D. Hastings, Hupp Motor Car Corporation; A. J. Brosseau, Mack Trucks (Inc.); Robert C. Graham, Graham-Paige Motors Corporation; H. H. Rice, General Motors Corporation; A. R. Erskine, the Studebaker Corporation; Alvan Macauley, Packard Motor Car Co.; Roy D. Chapin, Hudson Motor Car Co.; Alfred Reeves, National Automobile Chamber of Commerce; William Metzger of Detroit; Charles M. Hayes and Howard Brown, of the Chicago Motor Club; Robert P. Hooper, Charles C. Janes, and Ernest N. Smith, of the American Automobile Association.

Other distinguished guests were: Viscount de Rohan, president of the Automobile Club of France; Edmond Chaix, Acting President of the Permanent International Association of Road Congresses; Professor Le Gavrian, Secretary-General of the Permanent International Association of Road Congresses; Senator Lawrence C. Phipps, of Colorado; and other officials of the Congress.

Mr. Thomas P. Henry, president of the American Automobile Association, delivered the following address at the luncheon:

Ladies and gentlemen, on behalf of the American Automobile Association and its 1,000 affiliated motor clubs in the United States and Canada, I bid you welcome.

We deem it an honor and a privilege to act the part of host to you distinguished delegates from 64 foreign nations gathered here for a great world Congress.

I have used the term "world Congress" on purpose. For this is a truly unique meeting of the nations. It is a meeting motivated by a common aim. It is a meeting in which national rivalries play no part. It is a meeting in which no secrets are being withheld, but in which the knowledge and experience that each and every nation has gained in the great work of road building is to be made available for the benefit of all.

The Permanent Road Congress is to my way of thinking the finest continuing example to-day of international cooperation in the interest of world progress.

Whatever standards we may adopt as the test of progress, we must concede that transportation is a vital factor in national advancement. From the dawn of history, transportation has had a vital effect on the lives of nations and of individuals. Is it any wonder, then, that the advent of motor transport, giving a new and personally controlled mobility to millions of individuals, should have wrought a great revolution with world-wide economic, social, and political implications?

Just think of it for a moment. Highways to Montreal, to San Francisco, to Mexico City, to Buenos Aires, to Berlin, to Rome, to Petrograd, to Belgrade, to Moscow, to Constantinople, and to Bagdad. Along them will march not the culture of one nation, but the cultures of all nations. Here has come true the modern dream of peaceful penetration and friendly intercourse which motor transport is making possible the world over.

It is very significant, ladies and gentlemen, that the motto of this Congress is composed of two Latin words, the meaning of which is "The Highway is Life." For it may be truly said that motor transportation, the basis of which is highways, is bringing to the people of all nations not only a wider distribution of prosperity, but also a widening of horizons, a broader life and better understanding.

Representing as we do a travel agency that handles 12,000,000 tours a year, at home and abroad, we have a deep interest in the progress of road building throughout the world. Every year sees a great increase in the number of Americans going abroad. Every year sees an extension of trails into the far places of the world. But great as is the American tourist army of today, it is but the advance guard of the army of to-morrow. It is an ingrained habit of our people that whenever possible they prefer to travel under their own power. The extent to which these couriers of commerce and peace will visit you depends in large measure on the roads you provide and the ease with which you make it possible for them to travel from frontier to frontier.

I am not qualified by training or experience to touch on the technical problem of road building. But I would like to say this: In building 500,000 miles of improved highways, we have made mistakes. Many of the nations you represent can avoid these, since the major part of your programs are in the future.

We built many of our highways too narrow for the load they were called on to carry and in doing so, we increased our costs at a later day and rendered more difficult of solution our great problem of safety.

In many instances, we built piecemeal instead of building on a co-ordinated and unified plan. This, you can avoid by building with a view not to the requirements of to-day but to the requirements of the years to come.

We learned too late that art and beauty have a place in our highway scheme—and that the landscape architect should work hand in hand with the highway engineer.

We were also too late in learning that highways created enormous new values which in turn were intensely commercialized and affected both the safety and the beauty of the road. Wise foresight will enable you to avoid the creation of such problems.

After you leave Washington, many of you will participate in tours into various sections of the United States. In course of these tours, you will visit many cities where A.A.A. motor clubs are eagerly looking forward to your arrival. Need I say that they stand ready and anxious to place all their hospitality and all their facilities at your disposal. I thank you.

RESPONSE OF M. CHAIX TO ADDRESS BY MR. HENRY

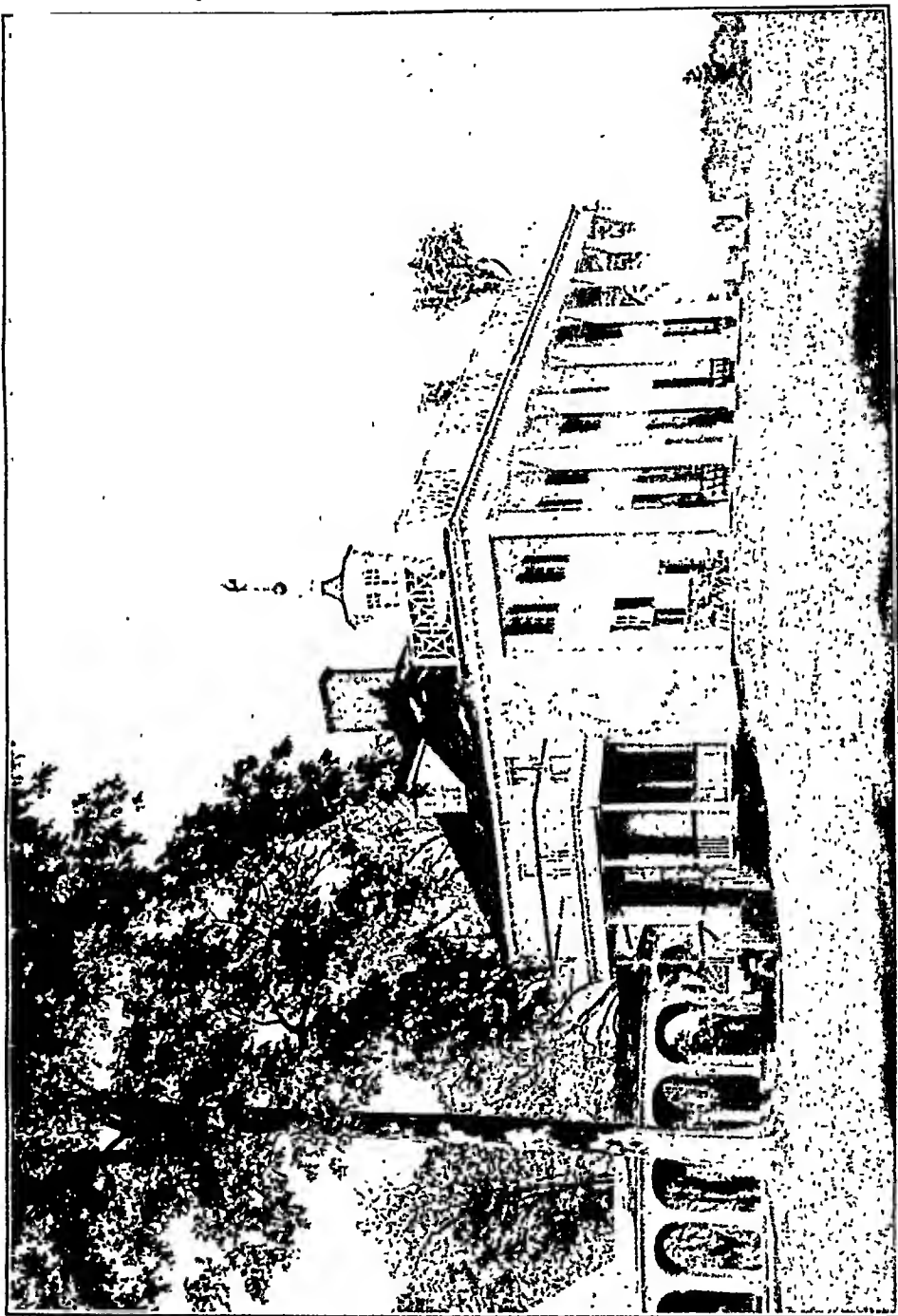
Responding in happy manner to the discourse of Mr. Henry, M. Edmond Chaix, Vice President of the Executive Bureau of the Permanent International Association of Road Congresses, thanked directors of the American Automobile Association for the part they had played in the organization of the Congress, and particularly for this splendid reception at which the presence of numerous ladies lent an especial charm.

For a long time, Mr. Chaix said, he had appreciated the great activity and cordiality of the American Automobile Association, and stated that he counted himself happy to take this occasion to propose the health of this great association, of its President, Mr. Henry, and of all his colleagues.

EXCURSION TO MOUNT VERNON AND INSPECTION OF THE MOUNT VERNON HIGHWAY

The excursion to Mount Vernon, the home of George Washington, and inspection of the Mount Vernon Memorial Highway took place on Wednesday afternoon, October 8. The trip was made in busses in which the delegates were grouped according to the different languages, and guides indicated all points of interest in the language of the particular group to which they were assigned.

Mount Vernon is approximately 16 miles from Washington and the route crosses the Potomac River, passes through the historic city



MOUNT VERNON
THE HOME OF GEORGE WASHINGTON

of Alexandria and thence to Mount Vernon, which is located on a bluff overlooking the Potomac.

On arrival at Mount Vernon the delegates visited the mansion, which is a fine example of colonial architecture and is visited annually by thousands of people. It was from here that George Washington went to lead the Continental Army in the Revolutionary War, and it was here that he spent his last years, after serving as the first President of the United States.

The Permanent International Commission performed an interesting ceremony in laying a wreath on the tomb of George Washington. The wreath was placed by Vicomte J. de Rohan, a member of the official delegation of France and a kinsman of the Marquis de Lafayette, Washington's friend and trusted adviser, who gave unsparingly of his wealth and valued personal service to the American cause in the Revolutionary War.

After inspecting the construction work on the terminns of the Mount Vernon Memorial Highway at the gates of Mount Vernon, the return trip was made over all accessible portions of the new highway. Each delegate was supplied with a booklet descriptive of the project and containing detailed drawings and illustrations of engineering features of special interest. Stops were made at a number of points so that the delegates might inspect the construction. This highway has been planned to represent the best modern practice in both details of construction and in landscaping the adjacent area.

RECEPTION BY THE SECRETARY OF STATE

The Secretary of State, Mr. Henry L. Stimson, received the delegates to the Road Congress at the Pan American Union on the evening of Wednesday, October 8. The Assistant Secretary of State and Mrs. William R. Castle, jr., assisted the Secretary, Mrs. Stimson being absent from their home at the time.

The Pan American Union Building provided a beautiful setting for the first formal evening function of the Congress. For the first time many huge spot lights were thrown on the front of the white stone building, bringing into relief against the night sky all of its most beautiful architectural features.

Dr. Leo S. Rowe who, as director-general of the Pan American Union, is always host in the beautiful building, followed his custom of receiving the guests as they entered the doorway. Secretary Stimson and Mr. and Mrs. Castle stood at the head of the stairway in the Hall of Flags to receive more than a thousand guests. Mr.

Benjamin Cohen, chief interpreter for the Congress, made the introductions.

Invitations had been issued to all delegates to the Congress and also to the diplomatic missions of the various countries, and the gathering was one of unusual size and brillianee. Many of the delegates from North and South America were attending their first International Road Congress and welcomed the opportunity of meeting socially the many engineers of international prominence.

The guests circulated in the Hall of the Americas, meeting new and old acquaintances, while others danced to the strains of music furnished by the Marine Band Orchestra, or strolled in the softly lighted patio and gardens.

Supper was served the guests in a room adjacent to the Hall of the Americas.

RECEPTION BY THE PRESIDENT AND MRS. HOOVER

The President and Mrs. Hoover extended a personal greeting to the delegates to the Congress at a reception at the White House on the afternoon of Thursday, October 9, at 5 p. m.

Fifteen hundred delegates and representatives of diplomatic missions from many countries assembled in the State Dining Room and East Room to be received by the President. The State Stairway was banked with ferns and roses, and early fall flowers were used about the State Room. The Marine Band, stationed just inside the north door, in full regalia, together with the gold braid of the uniforms of the President's military and naval aides, added color to the interesting scene.

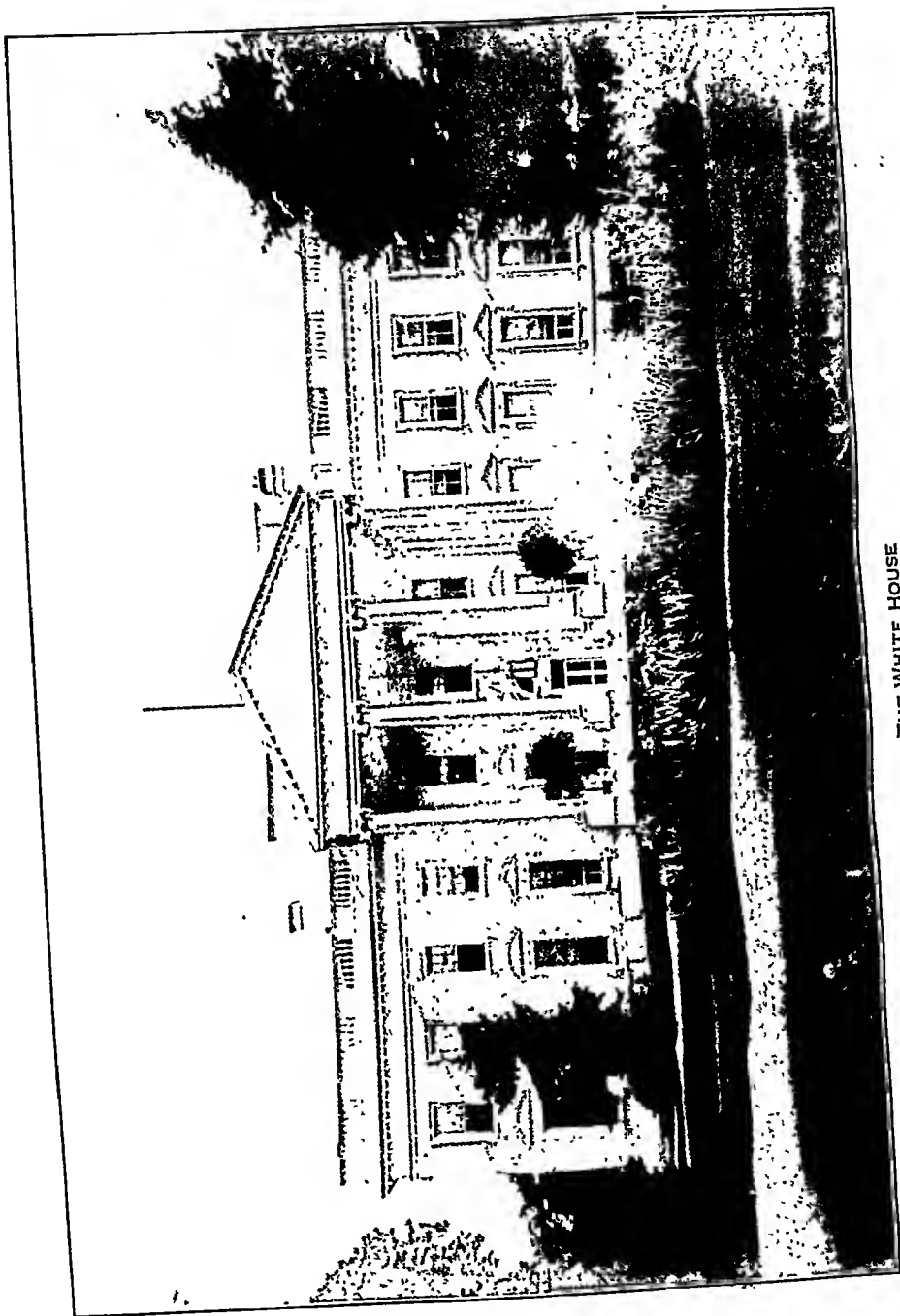
At 5 o'clock the band struck up Hail to the Chief and the President and Mrs. Hoover, preceded by the aides, crossed the corridor to the Blue Room, where they received their guests.

The hosts, standing before a screen of palms, first greeted the heads of missions and members of the Cabinet and then the delegates to the Road Congress.

After being received by the President and Mrs. Hoover, the guests lingered in the spacious rooms and in the long corridor of the Executive Mansion, chatting with their acquaintances and viewing the paintings and other furnishings of the President's home.

DINNER OF THE AMERICAN ORGANIZING COMMISSION

The American Organizing Commission entertained the delegates at a dinner at the Willard Hotel on the evening of Thursday, October 9.



THE WHITE HOUSE

The delegates were greeted on arrival by officers of the commission and were then seated at the tables. During the dinner an orchestra played a number of selections associated with the different countries represented and between the courses individual artists entertained the guests with musical selections.

Following the serving of the dinner the Hon. Arthur M. Hyde, Secretary of Agriculture, made a short address which was responded to by Mr. Rees Jeffreys, of England; M. P. Christophe, of Belgium; Herr Oberbaurat Münster, Minister of Austria; and Sr. Rodriguez Spiteri, of Spain, each speaking in his own language and on behalf of all delegates speaking that language.

ADDRESS OF HONORABLE ARTHUR M. HYDE

I count it a privilege to be in attendance at this meeting. It has been a pleasure to meet so many of the highway and transportation authorities of the 60 great nations assembled for this Congress. The United States is proud to be the scene of your gathering and to occupy the rôle of host to such distinguished visitors.

Detailed questions of technical complexity are not for primary consideration to-night. Such problems have occupied your attention during the last two days. They are important, and your joint study of them should have permanent and beneficial results. But such problems are only segments of the great program upon which our several nations have embarked.

The final achievement of that program and the service it will render to civilization can not be foreseen until long after it has been accomplished. Some foreshadowing of that ultimate service can be seen in the results which are known to have flowed from road-building efforts of the past and from the results which are already flowing from our incomplete efforts in the present.

The classic example of the influence and the service rendered by roads is the great engineering ways of ancient Rome. The toil of millions went into their construction. Their cost is said to have wrecked the Roman treasury. So ephemeral are even the greatest structures made from material things that those roads are gone. Scarcely traceable remnants remain.

Were they, then, a failure? Was all the human sweat and toil wasted? Let us not forget that a commerce vastly more valuable than traffic in silks and spices, wares and merchandise, came over them. Roman law, Greek art, and religion spread out over them and have thus come down to us. These are gains that are imperishable and beyond price. Thus do the intangible values outrun in permanency the tangible works which gave those values currency.

On economic grounds alone, all the billions which we are paying out for hard-surfaced roads in this country are justified. Bad roads represent a continual drain upon the resources of the people. Every mud hole in the road, every ditch across the road, represents just one more strain or shock upon the vehicle, whether wagon, buggy, or automobile. Every such mud hole, ditch, or ledge requires just that much more energy, whether of horses or gasoline to surmount it. Every such obstacle does to that extent lose time and impede progress. Every such obstruction is to that extent a never-ending expense in repairs, wasted energy, and time. A careful and conservative estimate of the cost of bad roads to automobile owners alone, not including losses of time, is much greater than the cost of maintenance of good roads.

Nor can the value of good roads, or the losses due to bad roads be expressed in money. Like all other good things, hard-surfaced roads have immense collateral values. Collateral advantages and intangible values spring up around every useful enterprise. To this rule there are no exceptions, and good roads form a particularly happy illustration of its truth.

Good roads answer the need of humanity for one of the three essentials of organized society—food, shelter, and transportation—and they serve all three. Good roads are lines of easy transportation and communication. They relieve the tedium and isolation of the country, and offer the blessings of rural life to the city worker. They form lines for the development of community interest. They foster and create community development: bring educational and recreational values to dwellers in the city and country alike: develop national and state patriotism. It has been shown that the standard of living is higher along a good road than it is along a bad one. It has been proven that the percentage of illiteracy is lower along a good road than it is along a bad one.

Who can measure in mere money the actual worth of these collateral and intangible values of a national state-wide system of hard-surfaced roads? What figure is large enough? I am not insensible of the force and weight of the purely practical argument based on the reduction of the cost of hauling a ton per mile. The road program is triply justified upon this basis alone. Nevertheless, the road program never looms so large or seems so important to me as it does when I reflect that along the national system of all-weather roads will inevitably cluster community centers, with greater churches and better schools: and that the roads themselves will be arteries of communication and transportation, carrying the blessings of education and of uplift to the remotest corner of the nation, offering equality of opportunity to the humblest dweller in the land.

The Nation is close knit, has greater solidarity and broader interests in common because of the development of our road system. The realization of these great social and political benefits has caused our people enthusiastically to support our vast program of road construction. Upon it we have spent in recent years billions upon billions of dollars. Our people do not need to be told that good roads pay. They no longer ask themselves whether they can afford to have them. They know by actual experience that they can not afford to be without them: that they simply could not live their lives as they want to live them were it not for the constant, intimate services of the motor vehicle and the road.

Yet I would not have you think that we are plunging blindly and recklessly into a huge expenditure without regard to the economic consequences. On the contrary we have very carefully counted the cost in cold dollars and cents and measured the benefits against those costs. On that stern and unyielding basis alone the revenue we have appropriated to road improvement purposes is not spent but invested. The actual monetary gain is greater than the cost. The multiplied savings effected by the operators of our 26,000,000 motor vehicles as a result of the improvement of the roads exceeds by a very handsome margin the cost of the improvement. We are putting road improvements and motor vehicles to a very thorough test in the United States. Our experience with both has already been extensive and, I think, conclusive. Both have taken their places as national blessings which we can not afford to do without.

We of the United States not only acknowledge the debt we owe to our highways but as well to those who have built them. We assess at their full value the service of those who have provided motor-driven vehicles, which made those highways both necessary and desirable and which have in turn stimulated the motor industry to produce the millions of cars which now throng them. We realize the importance of the more intimate contacts of our people, one with another, throughout the length and the breadth of our land which those roads have made possible. We see and understand the quickening processes of industry and commerce which they have facilitated, and we honor the engineering skill and talent which have gone into their construction.

Good roads have also an international implication. They are lachstrings of hospitality hung out for visitors to freely enter our house. In this spirit we offer you not only the lessons of our experience, but the use of the roads we have built. We wish you complete success with your own road program. We want to use your roads just as we want you to use ours, not merely as a means of transportation but as highways to neighborliness and friendship.

ADDRESS OF MR. REES JEFFREYS, OF GREAT BRITAIN (SPEAKING IN ENGLISH)

Mr. Chairman, ladies, and gentlemen, on behalf of the English-speaking peoples I am permitted to say how glad we are to take part in this historic Congress. Not only Great Britain and Ireland are represented here to-day but most of the Dominions and Governments included in the British Commonwealth of Nations and scattered through the Seven Seas. On behalf of the English-speaking ladies I want particularly to thank the ladies of Washington for their hospitality. They have shown every kindness and consideration to their guests. It was my privilege as an official of the British Government to visit this country 18 years ago. At that date you had very little to show the world in the way of highways but in the succeeding 18 years you have achieved miracles. You have spent money freely. You have employed the best engineering ability. In the result you have built highways, bridges, and parkways which are the admiration of the civilized world. I would like in particular to say a special word of praise for your park systems and parkways.

In 1912 you were behind Western Europe in your road systems—now you are in front. In 1912 you could teach us little—now we come to the United States from all parts of the world to learn the best methods of road construction; to examine the most up-to-date road machinery; and to buy the most up-to-date textbooks.

Mr. Hyde, in 1912 I had the pleasure of meeting your predecessor, Mr. Secretary Wilson, and discussing with him and others of your statesmen the project of Federal aid. Federal aid is now an accomplished fact. It is a mighty instrument encouraging and helping the people of the United States to build a great highway system. May we congratulate you, Mr. Secretary and our friend Mr. MacDonald, on the excellent use you are making of that instrument.

We are passing through a revolutionary time but of all the revolutions none have affected greater social changes than the development of the motor vehicle. If we are to take advantage of the motor vehicle we must build more roads, safer roads and more beautiful roads. In this endeavor to provide the "road safe" and the "road beautiful" we are being greatly assisted and encouraged by the work you are doing in the United States of America.

It is said that the greatest of British interests is peace. You in the United States are seeking to eliminate war as an instrument of national policy. I venture to echo the thought of your Secretary of State, Mr. Stimson, that we who make roads and encourage international road travel are helping forward world peace.

ADDRESS OF MONSIEUR PAUL CHRISTOPHE, OF BELGIUM (SPEAKING IN FRENCH)

In the name of the French-speaking members of the Congress, I desire to bring to the American Organizing Commission of the Sixth Road Congress the assurance of our gratitude. The commission has truly found the way to our hearts by having given to all the members the same facility for following the discussion, thanks to this original and admirable system of instantaneous translation by means of the microphone. And in this I cite only a single example, for everything is to be praised in the faultless arrangements made by our distinguished President, Mr. Roy D. Chapin, and our tireless Secretary General, Mr. Thos. H. MacDonald. Not being French myself, it is proper for me to associate in these thanks the Bureau of the Permanent International Commission represented here by the Vice President, Mr. Chaix, and the Secretary General, Mr. Le Gavrian, whose collaboration with the American Commission has been so fruitful.

I take this occasion also to thank the American Road Builders' Association and the American Automobile Association for the cordial reception which they have given us. The splendid exposition of equipment and materials which we have visited, and the practical application of these which we have already seen, fill us with admiration and astonishment.

Without doubt, the conditions under which we work in Europe are not the same as those we find here. Our task is to improve an existing road system, and we possess for this work a plentiful supply of man power which is relatively inexpensive. European civilization is the result of a very long experience acquired through the efforts of a modest and industrious population, but what losses there are of useful energy in the work of our men, what insufficiency in results. The American engineers show us the means of producing more quickly and more regularly by the aid of machines, and they demonstrate for us the excellent results of the materials which they use. They may be certain that, upon our return to Europe, we shall know how to render homage to them and to cite them as examples to our contractors.

ADDRESS OF HEHR OBERBAURAT MÜNSTER, OF AUSTRIA (SPEAKING IN GERMAN)

Mr. President, ladies, and gentlemen, in the name of the members of the Congress speaking the German language, may I be permitted to say a few words.

As I survey the events, both the passing ones and those still to come, of this Congress, its meetings, as well as the observation of road building and equipment, I am obliged to notice that not only

have our antieipations been fulfilled, but that they have surpassed by far what we expected. We return to our various countries filled with wonderful impressions and with new inspirations which will advance the progress of road building.

This is not all. If I compare what we have heard and seen in the province of road building with a beautiful picture. I am impressed that such a beautiful picture demands an appropriate setting. We have absorbed the beautiful picture of the Congress in the land of impressive buildings and technical masterpieces and were the old Greeks to undertake to compile a new list of world's wonders, they would find many of them in America. I can not think of a finer setting, a more suitable background for the deliberations of this Congress than this beautiful country.

A beautiful picture must be presented in a suitable setting if the proper effect is to be obtained. At this point I come to the hospitality with which this Congress has been received in America, and which has aided and helped us at every turn. The courteous host is in harmony with the lovely picture in that beautiful setting with which he presents us. We extend our most cordial thanks to all the Americans who have been concerned with the successes of this Congress and who have taken care of the foreign members in such a wonderful manner. We thank you, as a whole, and also the American Organizing Commission in particular.

ADDRESS OF SR. RODRIGUEZ SPITERI, OF SPAIN (SPEAKING IN SPANISH)

You have given us great pleasure by selecting a member of the Spanish delegation to speak to the delegates and guests on behalf of the Spanish-speaking members of the Sixth International Road Congress.

In the name of all the delegates who speak Spanish, I first of all want to thank the many high officials of this country for their kindness and attention toward us, and the various companies and organizations that have entertained us. I also thank the Organizing Commission of this Congress for their constant attention and concern, and the great American people for their hospitality.

I must not let the occasion go by without telling you of the great admiration we feel for the efficiency of the organization of this Congress, for the many innovations they have introduced here, and for the efficiency which characterizes everything done in this country. The impression that this your Capital City has made upon us will last as long as we live—its monuments, parks, and gardens make it a city of dreams, and a capital worthy of the Nation to which it belongs, and worthy too of the glorious name which

Moved by these thoughts, I should like to say, especially to the Latin American delegates, that, just as the Moslem priest raises his voice from the heights of the minaret, in order to proclaim again and again that Allah is in heaven, and great, and to invite the faithful to meditation and prayer—permit me this simile since I am almost African myself—I, too, raise my voice to ask that we unite our efforts to imitate and even surpass this great Nation, for only in this way can we become conquerors, too. And this, I submit, is not impossible nor even difficult, especially for the peoples of Latin America, for, if there is a California here in the United States, you, too, have a Potosi; if North America has a Mississippi, which makes fertile such a large part of the country, you, too, have an Amazon and a Plata; if they boast here the majestic Niagara, in the South you have the Iguassu, and to these mighty contributions of nature you add the great advantages of climate and the exuberance of the Tropics.

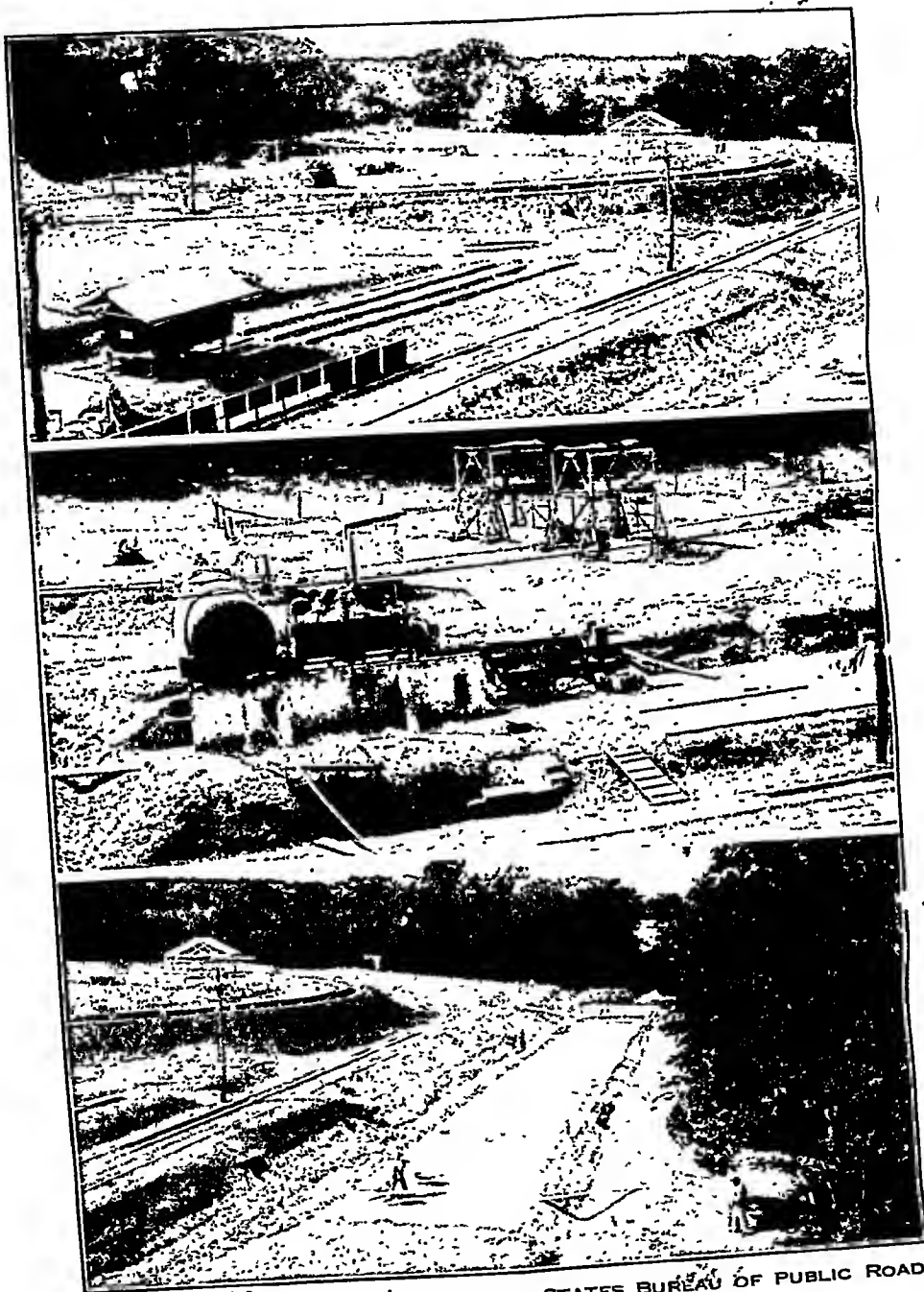
Let us bend all our efforts toward the honorable aggrandizement and betterment of our respective nations, just as the North Americans do. Let us not dissipate our energies in fratricidal struggles and quarrels, and in this manner we shall not only secure a larger share of the world's blessings for our children and our countries, but we shall also give the world proof of the fact that the Latin race honors its great past and its great history; that the Latin race is not now decadent; that the Latin race is not destined to perish from this earth.

EXCURSION TO ARLINGTON EXPERIMENT STATION OF UNITED STATES BUREAU OF PUBLIC ROADS

The morning of Friday, October 10, was devoted to an excursion by bus to the Arlington Experiment Station of the United States Bureau of Public Roads and an inspection of the various highway research projects being conducted there.

The experiment station is located across the river from Washington and has facilities for conducting both indoor laboratory experiments and field experiments. The bureau is conducting a test program which includes a wide variety of subjects in order that the large amounts of Federal-aid funds which it administers may be expended so as to produce the greatest highway service.

Special arrangements had been made in advance to give each delegate an opportunity to inspect each experiment in detail. On arrival at the station, the delegates were divided into groups and were given pamphlets containing a map showing the route to be followed and a short description of the research projects. The research



RESEARCH PROJECTS OF THE UNITED STATES BUREAU OF PUBLIC ROADS
AT THE ARLINGTON EXPERIMENT STATION

activities of the division of tests of the bureau are divided into four groups, namely, subgrades, nonbituminous materials and their uses, bituminous materials and their uses, and pavement and highway-bridge design. Thirteen groups of exhibits were presented as follows:

1. Methods of determining the stability of bituminous mixtures.
2. Subgrade laboratory.
3. Concrete saw.
4. Concrete laboratory.
5. Testing the surface hardness of concrete pavement.
6. Test of a special type of bridge-floor slab.
7. Tests of concrete slabs to determine relative strength of different designs.
8. Tests of thin brick pavements.
9. Wear of concrete pavements.
10. Core drilling of concrete pavements.
11. Modern road-building equipment.
12. Motor truck impact investigation.
13. Concrete curing experiments.

All apparatus and equipment were demonstrated by the personnel in charge of the work and actual tests or operations were performed in all cases where it was possible.

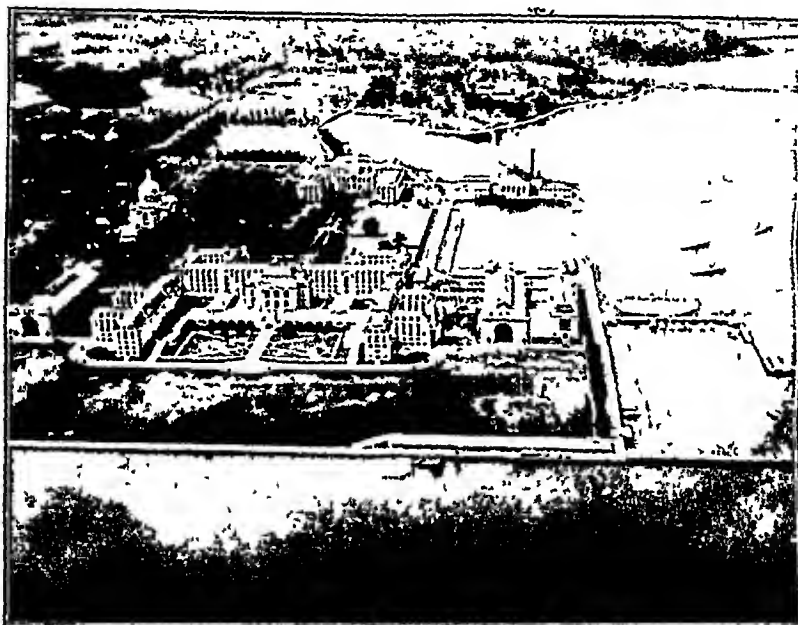
THE EXCURSION TO ANNAPOLIS

The program of the Congress was concluded with an excursion by bus to Annapolis, a visit to the United States Naval Academy and a reception and luncheon by the Hon. Albert C. Ritchie, Governor of Maryland, at the Annapolis Roads Club.

The trip to Annapolis was made over a portion of the transcontinental route designated as United States Highway No. 50, and matters of interest in connection with road construction were pointed out by the guides. An escort of Maryland State Police accompanied the party throughout the trip in the State.

After driving through the streets of the historic town of Annapolis which is the capital of Maryland the party went to the United States Naval Academy where they visited the many points of interest within the grounds. The Academy is beautifully situated on the Severn River about 2 miles from where it flows into Chesapeake Bay and is adjacent to the town of Annapolis. About two hours were spent at the Academy and then the party proceeded to the Annapolis Roads Club situated on the Chesapeake Bay a short distance from Annapolis.

On arrival at the club the delegates assembled on the lawn before the club house and Mr. Roy D. Chapin introduced the Hon. Albert C. Ritchie, Governor of Maryland, who welcomed the delegates to his State and pointed out the great importance of highway trans-



THE UNITED STATES NAVAL ACADEMY AT ANNAPOLIS

portation in the development of the State. Responses to the address were made by Monsieur Walter Bosiger, of Switzerland; Monsieur Vicaire, of Algiers; Sir Seymour Williams, of Great Britain; and Señor Jacinto P. Arango, of Costa Rica.

The delegates then descended to the beach where they were served an informal luncheon.

Following the luncheon the party returned to Washington.

Building, Sunday, October 5, from 4 to 6 p. m. The ambassadors of France and Turkey, a number of ministers and other members of the diplomatic corps in Washington were distinguished guests among the more than 800 persons who attended.

All delegates to the Congress were honored Monday afternoon at a similar affair when the attendance reached 500. The offices were decorated with flowers and palms for these occasions, and the young ladies of the staff served tea and light refreshments.

The association headquarters were offered to all visitors to the Congress for headquarters during their stay in Washington, and special mail, telegraph and telephone service was maintained for their convenience.

Tuesday noon, the delegates were taken in special A. R. B. A. busses from the Congress sessions to the auditorium, where a buffet luncheon was served to 1,600 guests, with a great many of the diplomatic corps and high government officials in attendance. W. A. Van Duzer, president of the association, gave the address of welcome to the visitors.

Immediately following the luncheon came the formal opening of the exposition, and the afternoon was set aside for visiting the many exhibits. At 4 p. m. the chartered busses took the entire body to the demonstration field, where the foreign delegates displayed keen interest in the grading operations shown.

The exposition continued each morning and afternoon during the week, and demonstrations were held late each afternoon.

For the first work in connection with road building, there were exhibits of surveying instruments and drafting tables. Next in order of use came all types of graders, tractors, shovels and cranes, dump wagons and scrapers, trucks, electric plants and tools, and industrial motors.

The tools which had to do with surfacing included those for rigid and nonrigid types of surfacing.

In connection with nonrigid road surfaces, there were shown asphalts, slag, tars, tractors, shovels and cranes, bins and batchers, electric tools, graders, loaders, conveyors, planers, trucks, crushers, industrial motors, bridge-floor units, distributors and heaters.

For the rigid types of paving, there were shown asphalts, slag, tars, tractors, shovels and cranes, bins and batchers, electric tools, concrete mixers, concrete-surfacing machinery, loaders, conveyors, trucks, crushers, industrial motors, hoists, bridge-floor units, electric plants, curing methods and materials, brick, Portland cement, and reinforcing steel.

For maintenance, there were exhibits of motor graders, tractors, cleaning tools, loaders, conveyors, mowers, planers, trucks, crushers,

industrial motors, hoists, bridge-floor units, distributors and heaters, and bearings.

In connection with the actual operation of highways, there were traffic signs and signals (electric, gas, and reflector), loadometers, street cleaning equipment, guard rail and fittings, and snow plows.

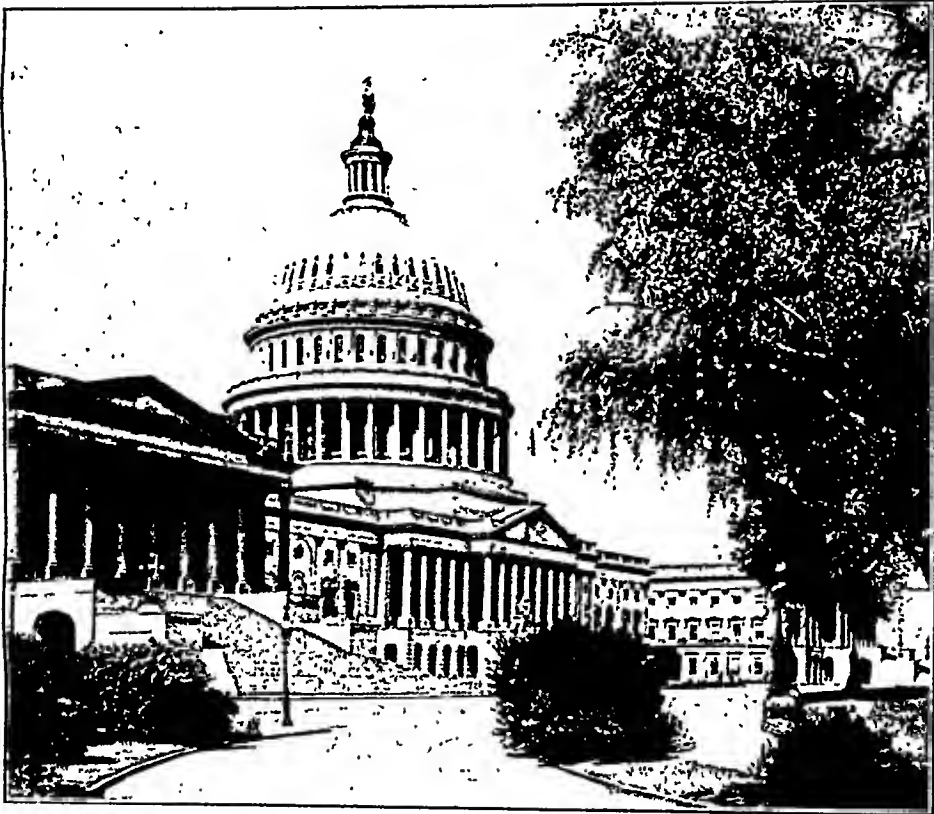
The leading American highway publications and technical press had exhibits. A booth that was of great interest and value to highway engineers was that of the United States Bureau of Public Roads, which illustrated the new findings in the science of subgrade and soils. Another Bureau of Public Roads exhibit was a very attractive model of the Mount Vernon Memorial Boulevard.

The list of exhibitors follows:

- | | |
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| J. D. Adams Co., Indianapolis, Ind. | Conant Machine & Steel Co., West Concord, Mass. |
| Allis-Chalmers Manufacturing Co., Monroch Tractors Division, Springfield, Ill. | The Concrete Surfacing Machinery Co., Cincinnati, Ohio. |
| The American City Magazine, New York, N. Y. | Contractors and Engineers Monthly, New York, N. Y. |
| American Gas Accumulator Co., Elizabeth, N. J. | Davey Compressor Co., Kent, Ohio. |
| American Tar Products Co., Pittsburgh, Pa. | Dual Duty Sales, Washington, D. C. |
| Armedo Culvert Manufacturers' Association, Middletown, Ohio. | Edwards Manufacturing Co., Cincinnati, Ohio. |
| The Arundel Corporation, Baltimore, Md. | Engineering News-Record, New York, N. Y. |
| The Asphalt Institute, New York, N. Y. | The Euclid Crane & Hoist Co., Euclid, Ohio. |
| Austin Manufacturing Co., Chicago, Ill. | Ford Motor Co., Washington, D. C. |
| The Automatic Signal Corporation, New Haven, Conn. | Galion Iron Works & Manufacturing Co., Gallion, Ohio. |
| The Barber Asphalt Co., Philadelphia, Pa. | Gillette Publishing Co. (Roads and Streets), Chicago, Ill. |
| The Barrett Co., New York, N. Y. | W. S. Godwin Co. (Inc.), Baltimore, Md. |
| Biehler Iron Works (Inc.), Reading, Pa. | The Good Roads Machinery Co., Kennett Square, Pa. |
| The Black and Decker Manufacturing Co., Towson, Md. | W. & L. E. Gurley, Troy, N. Y. |
| Blaw-Knox Co., Pittsburgh, Pa. | Hamilton Manufacturing Co., Two Rivers, Wis. |
| Burdley Road Marking Co., Dayton, Ohio. | Harmlschfeger Sales Corporation, Milwaukee, Wis. |
| Bragg-Killesrath Corporation, Long Island City, N. Y. | Hastings Pavement Co., New York, N. Y. |
| Bucyrus-Erie Co., South Milwaukee, Wis. | The Hell Co., Milwaukee, Wis. |
| The Byers Machine Co., New York, N. Y. | Heltzel Steel Form & Iron Co., Warren, Ohio. |
| Champion Tractor Co., Peoria, Ill. | Hercules Motors Corporation, Canton, Ohio. |
| Centaur Tractor Corporation, Greenwich, Ohio. | Highway Service (Inc.), New Bedford, Mass. |
| Central Iron & Steel Co., Harrisburg, Pa. | Charles H. H. & Co. (Inc.), New York, N. Y. |
| Clay Products Association, Chicago, Ill. | International Bitumen Emulsions Corporation, Baltimore, Md. |
| Clinton Motors Corporation, Reading, Pa. | Irving Iron Works Co., Long Island City, N. Y. |
| Colas Flintkote (Ltd.), London, England. | Kenfel & Esser Co., Hoboken, N. J. |
| Colprock Roads (Inc.), New York, N. Y. | Kimney Manufacturing Co., Boston, Mass. |
| | Kohler Co., Kohler, Wis. |
| | The Lakewood Engineering Co., Cleveland, Ohio. |

200 PROCEEDINGS OF SIXTH INTERNATIONAL ROAD CONGRESS

McEverlast (Inc.), Los Angeles, Calif.	Shell Petroleum Corporation, St. Louis, Mo.
Metalweld (Inc.), Philadelphia, Pa.	Southwark Foundry & Machine Co., Philadelphia, Pa.
The Alexander Milburn Co., Baltimore, Md.	Standard Oil Co. of New Jersey, New York, N. Y.
Motor Improvements (Inc.), Newark, N. J.	Standard Oil Co. of New York, New York, N. Y.
National Equipment Corporation, Milwaukee, Wis.	Stroud Road Machinery Co., Omaha, Nebr.
National Paving Brick Manufacturers Association, Washington, D. C.	The Texas Co., New York, N. Y.
Norma-Hoffman Bearings Corporation, Stamford, Conn.	Transit Mixers (Inc.), New York, N. Y.
Northwest Engineering Co., Chicago, Ill.	Truscon Steel Co., New York, N. Y.
Thinus Olsen Testing Machine Co., Philadelphia, Pa.	United States Bureau of Public Roads, Washington, D. C.
Pan American Petroleum & Transport Co., New York, N. Y.	United States Steel Products Co., New York, N. Y.
Portland Cement Association, Chicago, Ill.	Walter Motor Truck Co. (Inc.), Long Island City, N. Y.
Ransome Concrete Machinery Co., Dmellen, N. J.	Warren Bros. Co., Boston, Mass.
Reo Motor Car Co., Lansing, Mich.	Waukesha Motor Co., Waukesha, Wis.
W. A. Riddell Co., Bucyrus, Ohio.	Wej-Lock Manufacturing Co., Winter-set, Iowa.
Roads and Streets, Chicago, Ill.	Welshach Traffic Signal Co., Philadelphia, Pa.
Sawyer-Massey (Ltd.), Hamilton, Canada.	The White Co., Cleveland, Ohio.



THE CAPITOL

XIII. POST-CONGRESS TOURS

Four post-congress highway inspection tours were held. Three were invitation tours sponsored by the Highway Education Board and financed by contributions from industrial groups. To these were invited men who were official delegates to the Road Congress. The fourth tour was conducted by the American Automobile Association and was open to both men and women who participated in this tour at their own expense.

GOVERNMENT ASSISTED WITH TOURS

The routes traveled by the tours were laid out by the United States Bureau of Public Roads in cooperation with the highway officials of the various States visited. They were designed to permit the maximum possible inspection of construction and maintenance of different types of road and transport in the areas visited. Travel over finished roads was with a view to studying the traffic and service rendered by the roads. Finally, every possible opportunity was afforded those on tour to acquire a knowledge of the American people, their customs, their institutions, cities, industries, and farms.

Highway engineers were detailed by the United States Bureau of Public Roads and by each State highway department, to assist the delegates in obtaining all the technical data desired.

Detailed logs of the routes were prepared giving mileages, types of roads, costs, and volume of traffic. This was supplemented with specifications and other data as requested.

STATES COOPERATED

The chairman of the State highway commission, chief highway engineer of the State, district and division engineers, and a detail of State police met the tour at each State line. One engineer was assigned each bus to call attention to the different road types, explain their construction, and answer any questions. The engineers and interpreters worked together to make sure that all understood the material included in the detailed logs.

Consuls, commercial attachés, and other officials of the Departments of State and Commerce were designated to accompany the tour, that all language difficulties might be overcome by the presence of capable foreign language men, many of whom had served in the native countries of the delegates.

The United States Public Health Service and the United States Navy each contributed a physician to the staff. The Department of Agriculture made available motion-picture operators and still photographers to obtain a visual record of the tours.

Other members of the operating staffs were furnished through the Highway Education Board or loaned by cooperating organizations.

Chambers of commerce and civic organizations in the different communities were the hosts at breakfasts, luncheons, and dinners and at many entertainments.

TOURS VISITED DIFFERENT SECTIONS

The first of these invitation tours was directed through the industrial, thickly populated section of the East and Northeast, then proceeded westward through New York and Ohio to join with the other two tours at Detroit.

Tour No. 2 visited the South to enable delegates to view particularly the low-cost roads developed in that area under semitropical conditions.

Tour No. 3 visited the Middle West and Northwest to afford a study of highway conditions as they are met in northern latitudes in the United States.

The official tour of the American Automobile Association was to some extent a combination of the route of all three of the invitation tours, visiting the steel industry at Pittsburgh, rubber manufacturing at Akron, the stockyards at Chicago, automotive industry at Detroit, as well as seeing highway construction and use en route. The return to New York City was through Canada, across the States of New York and Massachusetts to Boston, thence to New York City.

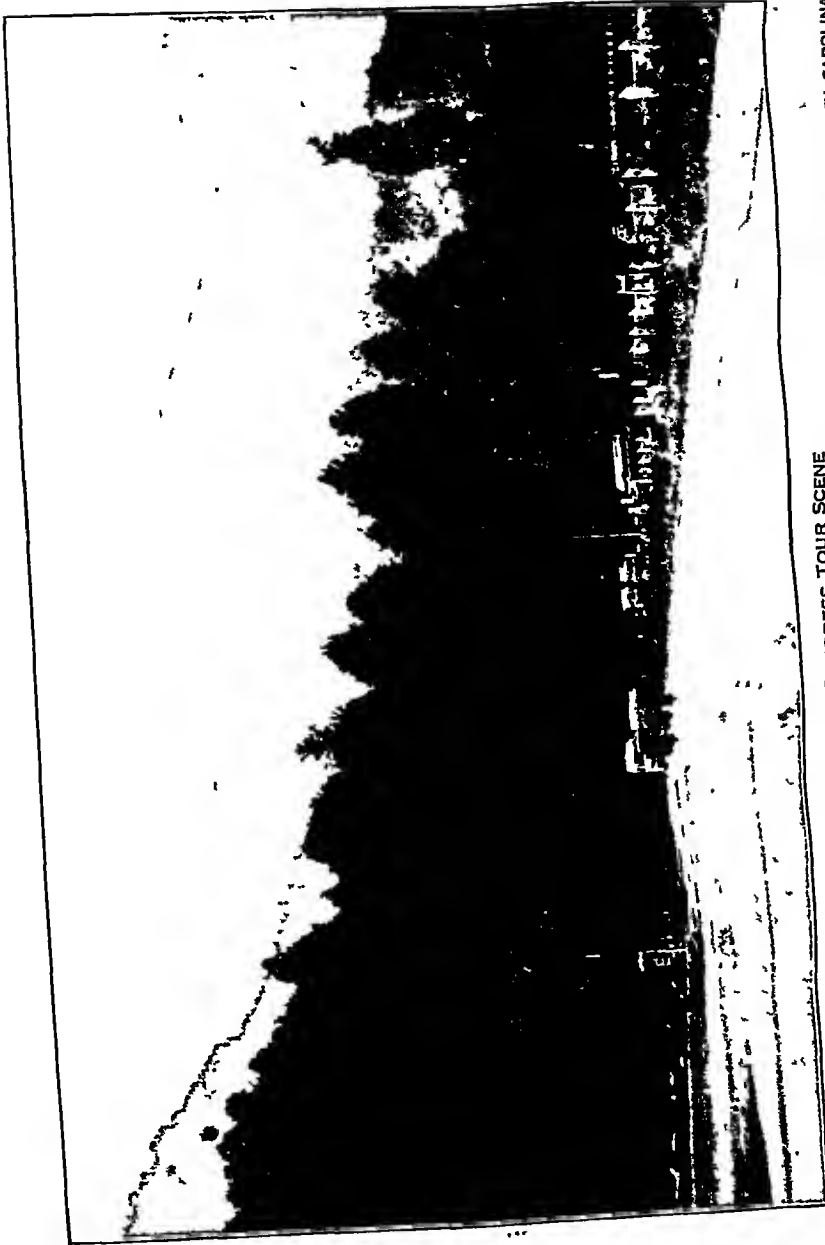
The tours were from 16 to 18 days duration, and ranged in distance traveled from about 2,300 miles for the first tour to more than 5,000 miles on tour No. 2.

THREE OBJECTIVES STAND OUT

At least three of the tour objectives were so outstanding in character as to deserve particular reference.

1. The marked results obtained through cooperative work in the United States. The fact that there is such active team work not only within individual industries, but between industries, government, and civic groups, constituted one of the most revealing insights into American road-building achievements.

2. Technical information on low-cost road construction and the utilization of local materials was of particular aid to the engineers. The actual demonstration of the wearing and riding qualities of some of these roads in Western Florida and Minnesota answered



POST-CONGRESS TOUR SCENE
BUSES BEARING OFFICIAL DELEGATES LED BY MOTOR-CYCLE POLICE ESCORT, TRAVELING AMID MOUNTAIN SCENERY IN NORTH CAROLINA

the questions of men who had traveled thousands of miles to study these roads.

The extent to which local materials are utilized constituted a corollary to the question of low-cost roads.

Methods were of particular interest—methods of construction, of finance, of maintenance.

3. Warm international friendships were formed, not only between the people of the United States and the representatives of foreign nations, but between the delegates of these different nations themselves.

.. TOUR ITSELF EXAMPLE OF COOPERATION

The method of financing and conducting the tours constituted one of the finest examples of cooperative work.

Industries united to underwrite the costs of the tours. Government—Federal and State—contributed largely of personnel services and equipment to insure their success. Civic groups vied with each other in entertainment.

TOURS MEET AT DETROIT

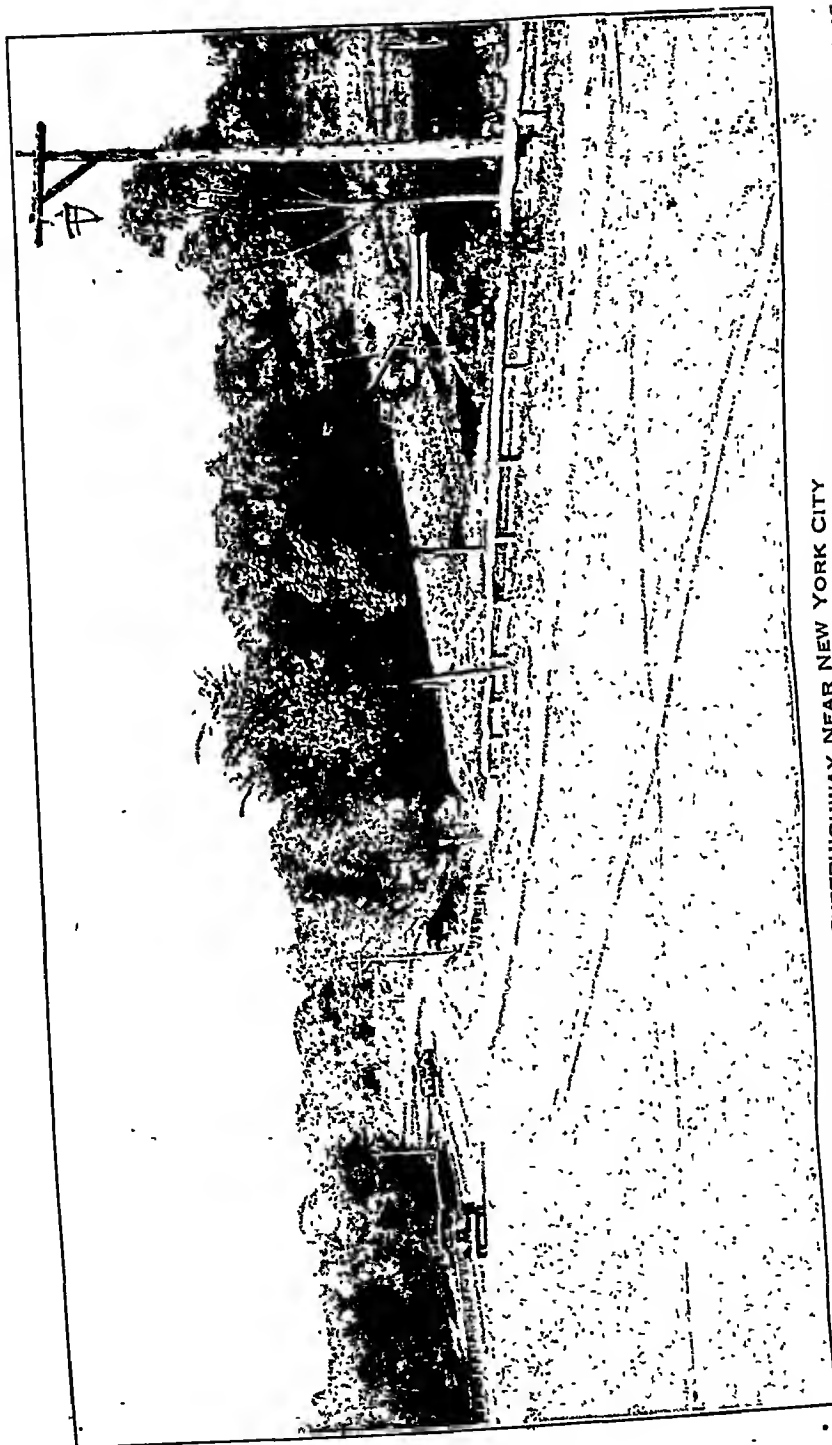
The three invitation tours met at Detroit at the conclusion of the highway inspection part of the trips and spent from four to five days in visits to automotive plants, culminating with a delightful dinner in honor of those participating in the three tours on Monday evening, October 27.

Included in the Detroit visit was an inspection of the highway research laboratories at the University of Michigan at Ann Arbor, and a football game between the University of Michigan and the University of Illinois. On the Sunday in Detroit the three groups united in a visit to the General Motors proving ground and attendance at a tea in honor of the delegates given by Mr. and Mrs. Roy D. Chapin at the Detroit Country Club.

During the stay in the city the delegates visited the Hudson-Essex body factory; Chrysler and Plymouth assembly line; Dodge truck plant; Hupp plant and the Packard Motor Co.; the Ford airport and factories at River Rouge; the Cadillac-La Salle factory; Graham-Paige plant and the Federal Motor Truck Co. Opportunity was also provided for a trip through the new International Tunnel between Detroit and Windsor which had not yet been officially opened.

· NIAGARA FALLS VISITED

Leaving Detroit by train the southern and western tours viewed Niagara Falls by daylight and after dinner at Niagara Falls, Ontario, Canada, the tours left by different roads for New York City.



SUPERHIGHWAY NEAR NEW YORK CITY

11UTCHINSON PARKWAY, ONE OF THE SUPERHIGHWAYS OF THE WESTCHESTER COUNTY PARKWAY COMMISSION LEADING INTO NEW YORK CITY, AS SEEN BY DELEGATES ON ONE OF THE POST-CONGRESS TOURS--CEMENT CONCRETE PAVEMENT FOR FOUR LANES OF TRAFFIC

NEW YORK (FIRST PART)

Traffic congestion in midtown New York was strikingly brought home to the party in the journey from the hotel to the city limits, but the splendid boulevards of Westchester County were a revelation.

Leaving the congested Boston Post Road with its heavy commercial traffic the busses proceeded over the Hutchinson River Parkway, a splendid "pleasure drive" restricted to passenger traffic only.

Winding through a vista of charming lakes and beautiful country estates, the splendid width of this boulevard and the engineering skill evident in its construction challenged the admiration of the layman as well as the engineer.

Again on the Boston Post Road local highway engineers visualized for the visitors some of the difficulties they faced in maintaining a traffic artery which carries a daily average of 16,850 passenger cars, 3,900 trucks, and 250 busses through the traffic congestion of a series of suburban towns.

CONNECTICUT

Crossing the Connecticut border a stop at the Southport elimination provided an opportunity to inspect modern overpass and underpass construction. Some of the finest 4-way road construction in the East made the journey to New Haven swift and smooth.

Yale University aroused the sincere admiration of the delegates, and the luncheon at the New Haven Chamber of Commerce commenced a series of local entertainment which was to continue throughout the trip.

The journey to the Massachusetts border included a visit to the State experimental road. The details of the sections of this road, including the cost of construction and maintenance for the various types of surfaces, were the subject of lively debate between the visitors and the local engineers.

MASSACHUSETTS

After remaining overnight at Worcester the tour party spent a strenuous morning on the new highway between Worcester and Boston. Here an opportunity was offered to see all stages of construction on a single modern superhighway. At one point the grading was in full swing. At another, a particularly difficult piece of swamp draining with unusual foundation construction was visited. Still further along, the mechanical equipment used in building up shoulders and grading along the finished road was particularly impressive.

At Boston a luncheon by Governor Allen of Massachusetts and an evening dinner by Mayor Curley completed the day. From Boston the route lay through Lexington and Concord, villages prominently identified with early American history, to Greenfield for a real old-fashioned New England dinner.

MOHAWK TRAIL

The route from Charlemont to North Adams lay over the famous Mohawk Trail extending 14 miles over Hoosac Mountain through one of the most scenic sections of the Berkshire Hills. This splendid example of highway construction in mountainous territory illustrated how a dirt road, formerly impassable in the winter and early spring, had been turned into a 24-foot modern bituminous macadam surface, unsealed on heavy grades to prevent skidding.

NEW YORK (SECOND PART)

Again entering New York the tour party proceeded through Troy across the Hudson River to the world-famous industrial city of Schenectady. Here the visit included an inspection of highway lighting and some beautiful electric fountains installed in the public parks. A morning was spent at the plant of the General Electric Co. who were also the hosts at luncheon.

The journey to Syracuse along the famous Cherry Valley turnpike through a beautiful and highly cultivated farming region offered indisputable proof of the value of improved highways in the form of increased values, more and better means of communication and a wider range for social and commercial intercourse. A cordial welcome to northern New York was expressed in the evening dinner and the splendid speeches at Syracuse.

Before leaving for Rochester the members of the party were the guests of the Franklin Motor Car Co. and an hour was spent visiting this modern motor-car factory. The journey to Rochester offered the delegates an opportunity to study dual-type construction—Portland cement concrete and bituminous macadam—as well as some brick pavement.

A pleasant luncheon preceded the visit to the Eastman Kodak plant and the evening was made memorable by the concert given especially for the party by the Rochester Symphony Orchestra following the Chamber of Commerce dinner.

Proceeding to Buffalo a mammoth quarry which provides much of the crushed stone used in New York highway construction, was visited. Luncheon with the Automobile Club of Buffalo provided an opportunity for the exchange of helpful information between auto-

mobile club men in the party and the local officials. Evening dinner at the Statler Hotel as guests of the Buffalo Chamber of Commerce concluded the first week of the tour.

Not even bad weather interfered with the visit to Niagara Falls on Sunday which, through the courtesy of the Canadian officials, included a view of the Canadian falls from the Canadian side.

OHIO

Following an overnight journey by rail to Cleveland the party again boarded motor busses furnished by another prominent American manufacturer. The Cleveland visit was planned to include not only the splendid boulevards and parkways of the city but also visits to manufacturing industries located in and near Cleveland that relate to the road-building industry. The plant of the White Motor Co. was visited, followed by a demonstration of road-building equipment at the experimental field of the Cleveland Tractor Co. Luncheon was served at the plant of the Cleveland Pneumatic Tool Co. followed by a visit to the Lakewood Engineering Co., where an exhibit of road machinery had been arranged. The delegates were welcomed to Ohio by Governor Cooper at an evening dinner at the Chamber of Commerce.

Proceeding the next morning to Akron, the party visited the famous rubber-manufacturing plants of that city, and were guests of the automobile club at luncheon. A visit to the famous Zeppelin hangar gave an opportunity to watch for a few moments the construction work on the new giant dirigible being built for the United States Navy.

A delightful musicale and ten at the beautiful home of Mr. F. A. Seiberling preceded an evening dinner at the Portage Country Club. The entertainment at this dinner was received with great enthusiasm by the party largely for the reason that it consisted of selections by an orchestra made up of very charming young ladies. The bus trip from Akron to Toledo included the opportunity to contrast Ohio methods of building modern concrete pavements with those of Massachusetts. Many interesting technical differences were noted and commented upon. Several bridges under construction were also visited.

Ohio is noted for its mileage of brick pavement and the Ohio engineers accompanying the party were plied with questions regarding this type of surface as the busses traveled over many miles of it.

An evening dinner at the Toledo Chamber of Commerce was featured by the presence of many compatriots of tour members.

The last day in Ohio was occupied by a visit to the plant of the Willys-Overland Co., who were also hosts to the party at luncheon. In the afternoon the company provided a fleet of splendid new cars to convey the delegates to Detroit, where the members of the north-eastern tour had an opportunity to exchange experiences with their friends from the other two tours.

At the conclusion of the Detroit visit, tour No. 1 proceeded by rail to Harrisburg, Pa., for the purpose of visiting the testing and research laboratories of the Pennsylvania Department of Highways. The splendid building which houses the laboratory, the special equipment, and the excellence of arrangement and design aroused the keenest admiration of the visiting foreign engineers. The Harrisburg visit also permitted a call at the barracks of the State highway patrol and the acquiring of detailed information as to its operation and duties.

A fitting finale to the tour was the visit to the motor bus and motor truck factory of the Mack Co., of Allentown. The party was enabled to see all steps in the construction of modern heavy-duty motor vehicles, which was thoroughly appreciated.

A run by railroad to New York City concluded the tour on the afternoon of Wednesday, October 29.

SOUTHERN TOUR

An intensive "short course" on highways and highway transportation was participated in by 86 highway engineers and officials from 35 nations who were on the southern tour.

Seventeen days' time was involved in traveling more than 5,000 miles by rail and highway through 12 States and the Dominion of Canada. Miami to the south, Detroit in the Middle West, and Niagara Falls, Ontario, to the north were the directional termini on the circuit, which was concluded at New York City on the morning of October 30.

Nearly 2,500 miles of highway were seen by the delegates in the course of the tour through the five Southern States visited by motor bus.

Ambassadors of the highway, the tour group quickly found the road the open sesame to new international friendships through the Shenandoah Valley of Virginia and the mountains of North Carolina; from the heart of South Carolina to the historic city of Charleston; from hospitable Savannah, Ga., through the beautiful lake and fruit section of Florida, down the west coast, over the Tamiami Trail to Miami and the terminus of the road tour at Palm Beach.

ALL ROAD TYPES SEEN

While the low-cost road was the predominant feature of this particular tour, every road type was studied, from ordinary dirt roads up through the intermediate types to the finest of road surfaces.

All stages of construction were witnessed from grading to the pouring of concrete. Surface treatment on sand-clay, on lime-rock base, the application of seal-coat on surface-treated roads, and the building of concrete roads were seen in different stages.

TWELVE DAYS ON ROAD

Leaving Washington in five 33-passenger busses chartered from one of the largest bus operating companies in the United States, the delegates, accompanied by staff representatives of the Federal Departments of State, Agriculture, including the Bureau of Public Roads, Navy, and Commerce, Virginia highway officials, and motorcycle police escort, swung across the Francis Scott Key Bridge over the Potomac to enter Virginia for a 12-day trip over the highways of the Southland.

VIRGINIA

Through the Bull Run Battlefield of the Civil War, the route followed modern concrete, then on to newly relocated right of way to view the progress of work in the building of penetration macadam on the new road between Warrenton and Luray. The road was especially opened for the tour group to pass over the entire new section, though uncompleted for a considerable distance.

The christening of the tour occurred with the visit to the Luray Caverns and the serving of a typical southern luncheon al fresco.

Climbing over the Blue Ridge in the afternoon the tour party entered the Shenandoah Valley, visiting the Virginia Military Institute and Lee's tomb en route to Natural Bridge. New mountain construction, with a sample of detouring came on the second day, with luncheon at Roanoke and a welcome to North Carolina in the afternoon, verbally expressed at the excellent reception and dinner at Winston-Salem.

NORTH CAROLINA

Surface-treated topsoil excited general interest and comment on the drive from Winston-Salem to Brooks Cross Roads, with a steady climb of nearly 3,000 feet in elevation from there to Roaring Gap.

The longest run of any afternoon, 180 miles, was made between Roaring Gap and Asheville, including some mileage over secondary roads not on the State system. The real warmth of Southern wel-

come was emphasized at Lenoir by school children and crowds in the cities through which the tour passed. Again on the following day at Mars Hill on the side trip out of Asheville and on the route to Charlotte the same cordiality of feeling was evident. The dinner at Asheville, the reception at Mars Hill, and the luncheon at Chimney Rock implanted permanent memories of western North Carolina. On the technical side, the mountain construction, curves and guard rail protection, the power dam at Lake Lure and the 4-lane roadway between Gastonia and Charlotte aroused marked interest, as well as North Carolina achievements under bond financing of highways.

SOUTH CAROLINA

South Carolina cotton fields and the noted Winthrop College for girls at Rock Hill were on the opening program of the visit to South Carolina. Concrete road construction was studied after travelling over a State-maintained detour on township, county, and State sand-clay roads. A delightful luncheon prepared by the ladies of Winnsboro, a visit to the largest earth dam in the United States at Lake Murray, and a welcome by the Governor of South Carolina at the dinner in Columbia occupied the rest of the day.

An overnight trip by rail brought the party into Charleston on the private siding of the Standard Oil Refinery where breakfast was served at the plant, followed by an inspection tour. The morning included a review of the cadets at Citadel College, a sight-seeing trip of the city, a trip over the \$5,000,000 Grace Bridge across the Cooper River, an inspection of seal-coat application on surface treatment work on the Isle of Palms, concluding with a harbor trip from Fort Moultrie back to the city where luncheon was served at the Francis Marion Hotel.

GEORGIA

Construction through low, swampy land was surveyed along the route from Charleston to Savannah River bridge where a delegation from Savannah welcomed the tour party. A short drive around the city preceded the evening's program of dinner and entertainment at the Hotel DeSoto.

Leaving the hotel late on Sunday morning the busses were routed to Tybee and back, thence over some of the first concrete roads built in the South, in Chatham County, on the way to Brunswick. Luncheon at Brunswick was followed by the drive to Sea Island Beach where the lateness of arrival precluded more than a few holes of golf for the golfers. The evening's program of dinner on the beach, with negro spirituals sung by the light of bonfires, followed by colored boxing matches and a "battle royal" largely compensated for the shortness of time on the beach during the afternoon.

All stages of surface treatment on lime-rock base were carefully checked between Brunswick and Waycross, from the rough grading over which the party traveled, to the laying of the soft lime-rock, rolling and scraping of the base, and then the application of the surface treatment.

A southern barbecue luncheon provided a new treat for the visitors at Waycross.

At Valdosta the afternoon's ride was broken with a very pleasant reception and tea at the Hotel Daniel Ashley.

FLORIDA

Late in the afternoon the last State on the southern end of the journey was reached with the entry into Florida where further excellent surface-treated roads on lime-rock base provided easy access to Tallahassee.

The modern 18-foot concrete pavement out of Tallahassee to the west did not arouse a fraction of the interest and admiration that was expressed for the following section of surface-treated topsoil, built more than three years ago and carrying a daily traffic in excess of 1,000 vehicles without visible wear. Drills and knives quickly dug underneath, providing answers to many questions as to the possibilities in low-cost road construction for tropical and semitropical latitudes.

Lime-rock quarry inspection, a fish-fry, and a visit to a satsuma orange grove and dairy farm constituted the afternoon program, culminating with a welcome to the State by the governor at a banquet that night.

SECOND RAIL TRIP MADE

The second rail trip of the southern leg of the journey brought the party to Ocala where the famous Silver Springs aroused the admiration of all. New impressions followed quickly, as well-maintained and well-built roads with unusual shoulder maintenance directed the course of the tour to Orlando, whose beauty was acclaimed by the entire party. At the luncheon Mr. Dickson, now over 70 years of age, spoke of sponsoring the first international highway gathering at Orlando nearly 40 years ago.

After luncheon, with the route lying through the fruit and lake section of central Florida, the trip was again very pleasantly interrupted with a reception at Lake Wales and a visit to the Singing Tower. On to Tampa over a newly opened Portland cement concrete road, 20 feet in width, the tourists found a new welcome awaiting them in the form of a Spanish dinner.

Reconstruction work between Tampa and Punta Gorda, the new concrete bridge at Punta Gorda, built on precast concrete piling,

first officially crossed by the tour group, the new concrete bridge at Fort Myers and the palm-lined streets of that city, the Gulf of Mexico at Naples, and then the famous Tamiami Trail through the Everglades, a dinner tendered by the city of Miami, 10 radio speakers, and a dance at the municipal airport constituted the high spots of the next to the last day in Florida.

On the last day, a sight-seeing trip in Miami carried the tour group through Coral Gables, with a stop at the Pan American Airways airport, thence over the causeway to Miami Beach and northward over more new roads into West Palm Beach, terminus of the road inspection part of the trip. From there the party left by rail in a 38-hour hop to Detroit, where the three tours were again united until departure for New York by different routes, with tour No. 2 joining tour No. 3 in a visit to Niagara Falls after a remarkably fast railroad run through the Dominion of Canada. Time permitted a view of the Falls by daylight, then dinner, and then a view of the Falls as illuminated by electricity.

A night run by railroad through New York State, Pennsylvania, and New Jersey brought the tour to a conclusion at the Pennsylvania Station, New York City, on the morning of Thursday, October 30.

WESTERN TOUR

Delegates on the western tour numbered 79, representing 24 nations and independent colonial possessions. A staff of 19, of whom 18 were loaned by various cooperating organizations and Government departments, accompanied the party for purposes of interpretation and general assistance. The tour lasted 18 days, covering approximately 4,500 miles; about one-half of that distance was made by motor coach.

The primary object of the western tour, as distinguished from the companion eastern and southern journeys, was to observe highway construction, maintenance, and use in certain States in the northern latitude of the United States, to study the financial structures of the respective State highway systems, and to observe traffic conditions and regulations in the larger cities of the Middle West.

In particular, the low-cost road construction in Minnesota and Wisconsin, and the high-type pavements of Iowa and Illinois, were subjects of the closest scrutiny by the delegates.

In these aims the board had the active cooperation of the several State highway departments, and of the municipal authorities and civic organizations in the towns and cities. The tour had been carefully charted in advance and the schedule for each day was closely adhered to.

Studies were made in the States of Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri, and Michigan, and in addition, by railroad travel, the delegation crossed portions of the States of Maryland, Pennsylvania, Ohio, and New York, with an intermediate stop in Canada to view Niagara Falls.

The object of the tour was one of study and observation of highway transport principles, but the cordiality of the receptions accorded the delegates on every occasion was one of the most enjoyable features. In virtually every city where stops were made the delegates were guests of chambers of commerce or comparable bodies while in the States proper the respective State highway departments assumed the rôle of host for the duration of the tour.

The delegation left Washington on the afternoon of Sunday, October 12, by special train, with South Bend, Ind., as the first stop on the schedule. South Bend is a manufacturing center, and the members of the tour were guests of the Studebaker Corporation of America and the South Bend Chamber of Commerce. An inspection of the Studebaker plant and its proving ground was a feature of the day.

The afternoon was spent in studying the approaches to the city of Chicago, the suburban development of the second largest metropolis in the United States, and the ring of industrial activity that passes the border line of the city into the State of Indiana. The Universal Atlas Cement plant and the refinery of the Standard Oil Co. of Indiana at Gary, Ind., were inspected. The trip from South Bend to Gary was made by electric railway, and the remainder of the journey into Chicago by motor bus. The party reached the hotel at Chicago about 5.30 o'clock in the evening after a magnificent approach at dusk along the well-lighted Michigan Boulevard. Special motor-cycle police took the party into the city without interference of traffic.

The following day the delegation had an opportunity to study metropolitan traffic conditions and the boulevard system of Chicago, as well as grade-separation projects. Certain industrial plants of the city were visited, notably that of the International Harvester Co., and the day was concluded with a dinner in honor of the delegation given by the Chicago Association of Commerce.

On Wednesday, October 15, the delegation left the hotel to take a special train for Milwaukee, Wis. At this city the manufacturers of road machinery, had arranged an exhibit for the members of the tour. Here virtually every type of machinery used in modern road construction was placed on display and all exhibits were carefully studied by the visitors. At luncheon the delegates were guests of the Milwaukee Association of Commerce, leaving the city at 2 o'clock by motor bus for Madison, Wis.

Approximately 100 miles of travel by this method gave an opportunity for inspection of the concrete superhighways entering Milwaukee, built at a cost of \$100,000 per mile, of grade crossing elimination, of crushed gravel road, and of 16 and 20 foot concrete roads.

At Madison in the evening the delegates were the guests of the Madison Chamber of Commerce and listened to notable addresses by Gov. Walter J. Kohler, of Wisconsin, and President Glenn Frank of the University of Wisconsin. During the day the entire program had been under the general auspices of the State highway department with Jerry Donohue, chairman of the State highway commission, as the official host. Mr. Donohue and his engineers who explained the various types of construction, maintenance, finance, and other problems encountered in that State, endeavored to answer fully and explicitly the various questions propounded by the visiting engineers.

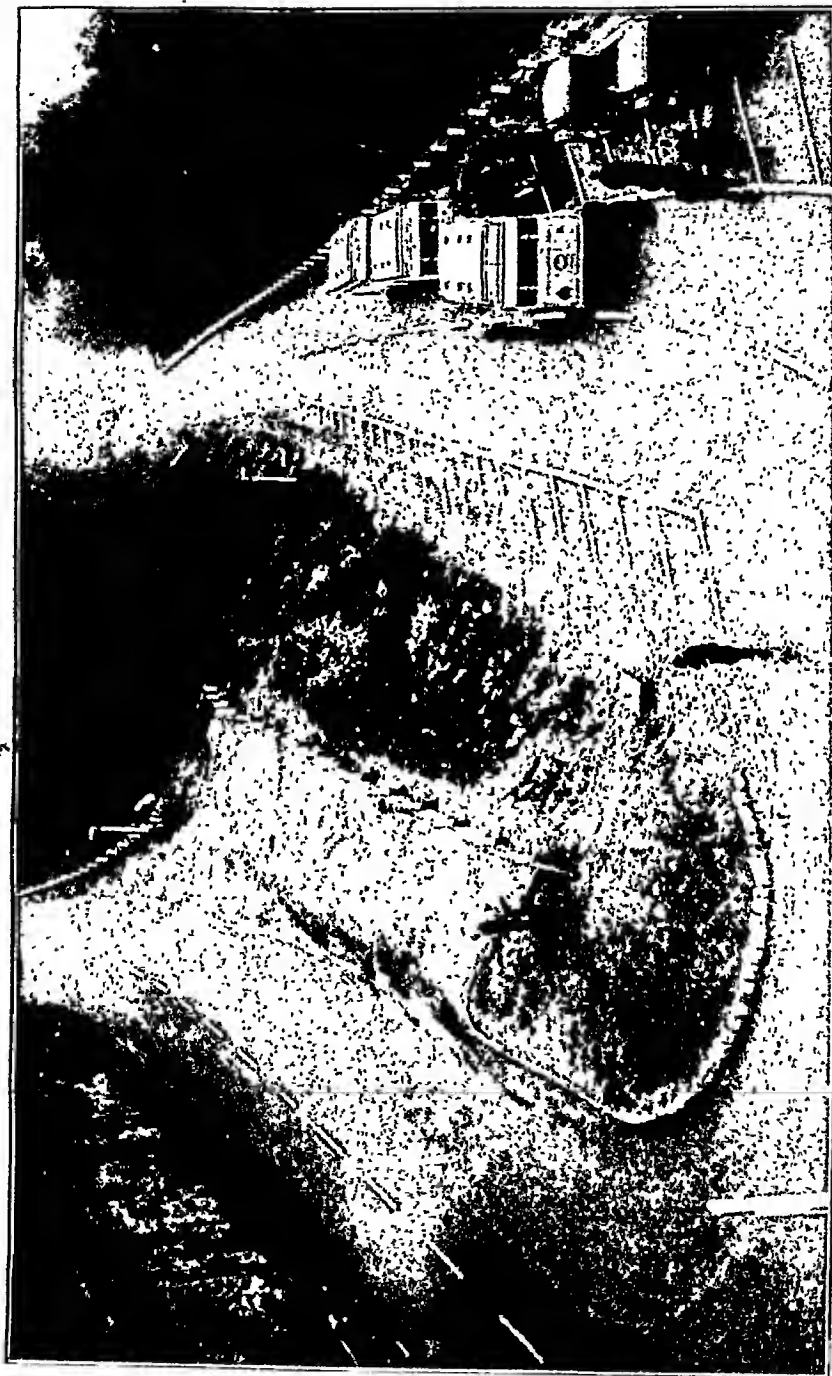
A railroad journey followed the dinner at Madison to carry the tour to its northernmost point at Duluth, Minn. Here the delegates were joined by C. M. Babcock, commissioner of highways for the State of Minnesota, and a corps of competent engineers, who guided the party for the ensuing four days.

In Minnesota the problems of road construction differ somewhat from those of other States. The State is notable for the long stretches of gravel road that have been built at moderate cost through sparsely settled territory. The morning of the first day in Minnesota, October 16, was spent in Duluth, viewing the city and its famous ore docks on Lake Superior. The afternoon was notable for the facility with which the delegation was transported in four commodious busses to Hibbing, where the night was spent. At Hibbing they viewed the largest open-pit iron mine in the world, the Hull-Rust operation which contributes a large percentage of the iron ore used in the United States.

The following morning, Friday, October 17, the delegates departed by motor bus for Minneapolis and St. Paul, known as the Twin Cities, where they were the guests of the Minneapolis Civic and Commerce Association and the St. Paul Association of Commerce.

Thomas H. MacDonald, Chief of the United States Bureau of Public Roads and chairman of the Highway Education Board, met the party at Minneapolis and was present at the dinner attended that evening at which Mayor W. F. Kunze was the principal speaker.

Saturday was spent in Minneapolis and St. Paul, and Saturday evening official welcome was tendered the delegates by Mayor G. W.



WHERE INDIANS BLAZED THE TRAIL

HAIRPIN CURVE ON MOHAWK TRAIL IN THE BERKSHIRE HILLS, MASS. WHICH FOLLOWS AN ANCIENT INDIAN ROUTE—NONSKID SURFACE OF BITUMINOUS MACADAM WITH CENTER STRIPE PAINTED ON CURVE TO PREVENT COLLISIONS. AND "HERRINGBONE" PARKING AREA ALLOWING MAXIMUM NUMBER OF CARS TO BE PARKED IN GIVEN SPACE—DELEGATES' BUSES AT RIGHT

Bundie, of St. Paul. Earlier in the day the delegation had been received by Gov. Theodore Christianson, of Minnesota.

Sunday was spent at Rochester, Minn., where the party visited the celebrated Mayo Clinic, from which point the tour passed into the State of Iowa.

Continuing by bus, the delegation reached Decorah, Iowa, over roads that varied from cement concrete to crushed rock surfacing on county trunk lines. At Decorah the party officially became the guests of the Iowa State Highway Department under the general direction of Chief Engineer Fred R. White, who addressed them that evening at a dinner tendered by the Cedar Rapids Chamber of Commerce at Cedar Rapids. Here another exhibition of road machinery was arranged for the inspection of the delegates.

During the two days in Iowa the roads of that State were the subject of most interesting study, the grade lines adopted and the distinctive lip-curb construction being objects of particular scrutiny. Demonstration of the raising of a settled concrete road slab by means of mud pumped through holes drilled in the slab was one of the features of the stay in Iowa.

In Iowa the delegates had an opportunity to meet Congressman Cyrenus Cole, who has sponsored much highway legislation in the National House of Representatives, and Congressman C. C. Dowell, chairman of the House Committee on Roads. At Des Moines, Tuesday evening, October 21, the delegation was addressed by Congressman Dowell, and Gov. John Hammill, of Iowa, and by other speakers.

Previously, an interesting half day had been spent at the Iowa State College of Agriculture and Mechanic Arts, where the tourists were received by Dean Anson Marston, of the school of engineering, and carefully inspected road experiments being made at the laboratories of the institution. A visit to the demonstration building of the State highway commission was one of the features of the day.

Columbia, Mo., reached by train which departed from Des Moines Tuesday evening, was the next stop on the schedule. A practical demonstration of road construction was given during the morning under the direction of Thomas H. Cutler, chief engineer of the Missouri State Highway Department, who also exhibited 29 different samples of concrete sections recently laid in the State of Missouri. The delegates were received by Gov. Henry C. Caulfield and had dinner that evening as the guests of the St. Louis Chamber of Commerce and the Missouri Auto Club at St. Louis. Travel was by bus, covering approximately 180 miles of cement concrete, gravel treated with calcium chloride as a dust palliative, oil-treated gravel, and other types of roads.

On Thursday, October 23, the delegates entered the State of Illinois for two days' stay with officers of the Illinois State Highway Department as their official host. They were met at St. Louis by Frank T. Sheets, chief highway engineer, and during the two days' travel in busses, covered 360 miles. The Illinois highway construction is of exceptionally high grade, Mr. Sheets explaining that Illinois had by one step proceeded from a State of mud roads to one of high-type construction. Virtually all the highway construction studied was of Portland cement concrete of varying widths.

Notable events in Illinois were the inspection of the Bates experimental road, the reception by Governor Emmerson at Springfield on Thursday afternoon, visits to the home and tomb of President Abraham Lincoln, and the study of the wide highway approaches to the city of Chicago. The delegates were entertained at Springfield and at La Salle, Ill., as guests of the chamber of commerce, and arrived at Chicago on Friday evening for departure by train to Ann Arbor, Mich.

At Ann Arbor they visited the university grounds and highway laboratories, and in the afternoon were guests at a football game between the students of the University of Michigan and the University of Illinois. That afternoon they went by train to Detroit where for four days they were guests of the automotive executives of the motor city.

After four days in Detroit, spent in company with members of the other touring parties as guests of the motor-vehicle industry, the delegates left by train for Niagara Falls and New York City, where the party disbanded on Thursday, October 30.

AMERICAN AUTOMOBILE ASSOCIATION TOUR

This tour, which was organized by the American Organizing Commission for the convenience of those delegates who could not participate in the Highway Education Board tours, and also for the wives of delegates participating in the official tours, was enjoyed by 61 persons representing 16 different nationalities.

The direction of the tour was in the hands of the American Automobile Association and their affiliated clubs. The party left Washington on the evening of Sunday, October 12, by special train for Pittsburgh, arriving there the next morning. Separate trips were arranged: the women going to the Heinz pickle factory, and the men to a steel plant of the United States Steel Corporation.

In the afternoon there was a combined trip for all members of the party to inspect the highways and construction projects under way

in and around the city of Pittsburgh. The arrangements were made by the Automobile Club of Pittsburgh with the assistance of the State and city engineers and a number of county engineers, who were at the disposal of the delegates during their stay.

The second day the party left Pittsburgh by motor busses for New Castle and Youngstown, where luncheon was served, and an inspection trip was made through the Youngstown Sheet & Tube plant. Then the party continued on to Akron, Ohio.

In Akron arrangements for the party's visit were handled by the Akron Automobile Club, and a trip through the Goodyear Tire & Rubber plant was made; also a visit to the Zeppelin works where the largest Zeppelin is being manufactured for the United States Navy. The party then continued on to Cleveland, Ohio.

In Cleveland a visit was made to the White Motor Truck plant, and a short tour of the residential section of the city. After luncheon there was an extensive road inspection trip which was arranged by the Cleveland Automobile Club. State, city, and county engineers were in attendance, and several projects under construction were visited and explained by them. The trip from Cleveland to Chicago was made by special train, and on the first day the tour was divided with a special sight-seeing trip of the city, and also a special trip to the stockyards according to the individual preference.

The second day was spent entirely in examining bridge and highway construction and all arrangements were made through the courtesy of the Chicago Motor Club which was assisted by State, city, and county engineers. Luncheon was served in St. Charles, Ill., after which the party returned to Chicago.

Considerable opportunity was given to members of the party to inspect and examine the many wonderful road projects in and around Chicago, including Wacker Drive, the Outer Drive, Chicago's 4-lane roads, and the new method of grade separation which has created considerable comment in road-building circles.

The party left Chicago on Sunday by special train, arriving in Detroit Monday morning. After breakfast they were immediately taken to the Ford plant where four full and interesting hours were spent; first going to the Ford airplane works, then through the motor-car plant. The afternoon was spent at the Cadillac plant.

The second day of the visit in Detroit was devoted entirely to the inspection of highways in and around the city. The program was under the direction of the Detroit Automobile Club, assisted by local engineers. On Wednesday, October 22, the party continued from Detroit to Hamilton, Ontario, and were given every possible courtesy by the Canadian Government in entering, there being no examination of baggage or passports. The luncheon stop was made at London, Ontario.

The following morning the party left over the Canadian National Railroad for Niagara Falls, stopping on the Canadian side, and the rest of the day was spent in general sight-seeing.

The tour continued by bus from Niagara Falls, Ontario, and the State Highway Department of New York assigned three of their members to accompany the party to explain to the delegates the different types of construction, and to answer any other general questions that might arise. Because of inclement weather conditions it was necessary to change from busses at Rochester and proceed by train to Syracuse, picking up the original program and continuing on to Boston.

In Boston, on account of inclement weather conditions, the road trip was canceled and a general sight-seeing trip substituted. This was unfortunate because the Massachusetts State Highway Department, together with the Boston Automobile Club, had laid out a very attractive tour for the members of the party in this section which is one of the oldest in America.

On Sunday, October 26, the party proceeded by train to New York. The programs on Monday and Tuesday were under the direction of the New York Automobile Club. On Monday an inspection tour was made over the highways of Long Island which enabled the members of the party to see where the majority of New York's tremendous population lives.

On Tuesday another tour was made into the Westchester suburban territory and many miles of the excellent parkway system were traversed.

Throughout the entire tour there was an abundant outpouring of courtesy and assistance by the populace and officials of the States visited. The party was never without official police escort, which gave it in every instance the right of way. Officials of every city vied with each other to make the visit of the party in their respective towns the outstanding success of the tour.

The party was directed by Mr. J. D. Ryan, manager of the foreign travel division of the American Automobile Association. Mrs. Dorothy MacHatton was hostess, and Mr. Nicholas Podlesski and Mr. A. M. Olmanns were the interpreters.

XIV. VARIOUS PAMPHLETS DISTRIBUTED DURING THE CONGRESS

HIGHWAY RESEARCH INVESTIGATIONS OF THE BUREAU OF PUBLIC ROADS AT THE ARLINGTON EXPERIMENTAL FARM (United States Department of Agriculture, Washington, D. C.).

THE MOUNT VERNON MEMORIAL HIGHWAY (Bureau of Public Roads, Department of Agriculture, Washington, D. C.).

INTERNATIONAL EXPOSITION AND DEMONSTRATION OF ROAD CONSTRUCTION AND MAINTENANCE—EQUIPMENT AND MATERIALS (program) held under the auspices of the American Road Builders' Association.

MODERN TRANSPORT IN THE UNITED STATES (American Automobile Association).

STREETS PAVED WITH WARRENITE-BITULITHIC (Warren Bros. Co., Boston, Mass.).

ASPHALT PAVEMENTS (The Asphalt Association, New York).

L'ASPHALTE POUR LES ROUTES ET LES AÉROPORTS (The Asphalt Institute, New York).

THE TREND OF PAVING IN THE LEADING AMERICAN CITIES (The Asphalt Institute, New York).

CHAUSSÉES EN ASPHALTE BERMUDEZ—BERMUDEZ ASPHALT ROADS—CARRETERAS DE ASPALTO BERMUDEZ (The Barber Asphalt Co., Philadelphia).

ROADS AND ROAD CONSTRUCTION (Oct. 1, 1930, London).

EBANO BITUMEN (Ebano Asphalt Gesellschaft, Hamburg).

LES METHODES RECENTES ADOPTÉES POUR L'EMPLOI DU GOUDRON, DU BITUME ET DE L'ASPHALTE DANS LA CONSTRUCTION DES CHAUSSÉES (Communication par l'Ing. Emilio GOLA, Président de la S. A. La Strada, Milan).

ANNALES DES TRAVAUX PUBLICS DE BELGIQUE, Bruxelles.

NATIONAL CONFERENCE ON STREET AND HIGHWAY SAFETY:

Report of the Committee on Maintenance of the Motor Vehicle.

Report of the Committee on Measures for the Relief of Traffic Congestion.

Report of the Committee on Traffic Accident Statistics.

Report of the Committee on Protection of Railway Grade Crossings and Highway Intersections.

Act I. Uniform Motor Vehicle Registration Act.

Act II. Uniform Motor Vehicle Antitheft Act.

Act III. Uniform Motor Vehicle Operators' and Chauffeurs' License Act.

Act IV. Uniform Act Regulating Traffic on Highways.

Model Municipal Traffic Ordinance.

Ways and Means to Traffic Safety.

REPORT OF THE COMMITTEE OF AMERICAN ENGINEERING COUNCIL ON STREET TRAFFIC, SIGNS, SIGNALS, AND MARKINGS, 1929.

"LIEBER" APPARATUS (Ateliers JEAN LIEBER, Lausanne, Suisse).

THE CONSTRUCTION SCHEME OF THE PROVINCE OF CHEKIANG (China), (July, 1929-June, 1934. Part I).

TEXACO ASPHALT STREETS AND HIGHWAYS IN CANADA (The Texas Co., New York).

- A WEEK IN BRISTOL (Itineraries for a 6-days' visit), (The British Development Board, Bristol).
- LES ROUTES EN PIERRES SELON LE SYSTÈME DU DR. DEIDESHEIMEN (Deriesso, Société Internationale de construction de routes, Zurich).
- ASPHALT UND ASPHALTMASCHINEN IM STRASSENBAU VON DR. ING. GEORG KLOSE, Mag. Oberbauamt in Berlin.
- TABULA VIARUM ROMANI IMPERII (Ente Nazionale Industrie turistiche, Rome).
- RAZONES PARA USAR AHUMADURA DE TELINO DE ALAMINE EN LAS VIAS DE HONMIGON (United States Steel Products Co., New York).
- WASSEN- UND WEGENAU ZEITSCHRIFT, Washington Sondernummer (Hannover, Berlin).
- MEMOIRE DESCRIPTIF SUR UN PROCÉDÉ DE FABRICATION D'UNE MATIÈRE SERVANT A RECROUVER DES REVÊTEMENTS BITUMINEUX DE ROUTES PAR IMPREGNATION DE GRAVILLON OU DE GRAVIER AU MOYEN DE MATIÈRES BITUMINEUSES par OSCAR DONIC (Brunnschweig).
- BROCHURES DE PUBLICITÉ DE L'ASPHALTE DE TRINIDAD (Prestite, Ltd., London).
- REVUE DU TOURING-CLUB ARGENTIN (juillet, 1930).
- AUTOMOBILE CLUB, ARGENTINO:
- Güta de los Caminos de Rodriguez y Moreno a San Fernando.
 - Güta del Camino de Moron a Lobos.
- UNION DE LAS AMERICAS CON LA CARRETERA INTERAMERICANA, por H. H. RICE, Director de la Camara de Comercio Nacional de Automóviles.
- REVISTA DE CAMINOS (número dedicado al Sexto Congreso Internacional de Carreteras), Santiago de Chile.
- COMISION NACIONAL DE CAMINOS—Anuario 1930 et brochures diverses (Etats-Unis du Mexique).
- ASOCIACION ARGENTINA DE IMPORTADORES DE AUTOMÓVILES Y ANEXOS (Buenos Aires):
- Contribución al estudio de la Ley Federal de Carreteras--
 - (a) La Validad Carretera de Nuyva Zelunda.
 - (b) Conclusiones del Segundo Congreso panamericano de Carreteras, Rio de Janeiro, agosto de 1929.
 - Abaratamiento de las patentes de circulación a los automotores (Memorial presentado al H. Consejo deliberante de la ciudad de Buenos Aires, noviembre 27 de 1929).
 - El uso del camión y su influencia en el transporte carretero (Memorial presentado a la H. Camara de Diputados de la Nación, diciembre 18 de 1929).

XV. MEETING OF PERMANENT INTERNATIONAL COMMISSION AND OTHER NOTES

A meeting of the Permanent International Commission was held on Monday, October 6. In the absence of Senator Mahieu, President of the Permanent International Association of Road Congresses, Monsieur Edmond Chaix, Vice President of the association, acted as Chairman of the meeting. A resolution was adopted that a message be forwarded to Senator Mahieu expressing regret at his inability to attend the Congress. It was also directed that a message of regret be sent to Chevalier Lagasse de Lochet, of Belgium, General President of the Second Congress, who also was unable to attend.

The report of the executive committee for the year 1929 and the budget for 1930 were adopted as printed.

Announcement was made of the award by the essay jury of the prize of 4,500 francs to Edwin W. James, formerly Chief of the Division of Design, United States Bureau of Public Roads, as the winner of the Belgian essay contest inaugurated in 1910 to encourage writing on road-building subjects. The jury award was confirmed by the commission. The title of Mr. James's essay was Highway Transportation, Construction and Finance. Mr. James, now occupying the position of Chief of the Division of Highway Transport of the United States Bureau of Public Roads, was an administrative aide to the Secretary General of the Congress. It was agreed that the rules regarding the next essay contest should be modified in accordance with recommendations of the essay jury.

Roy D. Chapin, President of the American Organizing Commission, and Thomas H. MacDonald, Secretary General of the commission, were nominated and acclaimed as President and Secretary General, respectively, of the Sixth Congress.

Vice President Chaix indicated that all delegations should present to the Secretary General the name of their first delegate who would occupy the position of Vice President of the General Bureau. Each delegation was also asked to appoint one or two vice presidents and secretaries for each of the Sections and submit their names to the commission.

An invitation to hold the next Congress at Munich, Germany, was extended to the Permanent International Association, on behalf of the German Reich Government, in the name of Dr. Ulrich Stapenhorst, head of the German delegation, by Oberregierungsrat Schutte.

The invitation was accepted by unanimous vote and Germany was chosen as the country in which the next Congress will be held.

A proposal that a permanent international index of books dealing with technical problems concerning highway construction be prepared was discussed and it was agreed that the matter be referred to the executive bureau and that a report be submitted at the next meeting of the commission.

At the conclusion of the meeting members of the commission were entertained at luncheon at the Carlton Hotel.

EXHIBIT OF ROAD WORK IN BRAZIL

An exhibit depicting some of the excellent examples of road construction in the United States of Brazil was shown in the patio at Congress headquarters. The exhibit consisted of plans and specifications, large pictures and a lifelike model. The model showed difficult location along a steep mountain side, requiring the construction of a concrete bridge at one point. The illustrations showed wide and well constructed roadways capable of carrying a heavy traffic, one of these roadways being located to reach the peak of a high mountain and showing boldness in design by the engineers.

ENTERTAINMENT FOR LADIES OF CONGRESS

A delightful program of entertainment was provided in Washington for the ladies of delegates attending the Congress, in addition to the numerous official receptions and excursions in which they shared honors with the delegates.

A committee of Washington women was in charge of entertainment for the visitors. Under their guidance as hostesses, the ladies were given sight-seeing and shopping trips in private cars, taken to theaters, and entertained informally in Washington homes. During the first three days of the Congress week, they attended the opening plenary session, the luncheon of the American Road Builders' Association, the luncheon of the American Automobile Association, and the official trip to Mount Vernon. On Thursday, a luncheon was held in their honor at the Columbia Country Club. On Friday, a luncheon was held at the Cosmos Club, followed by a theater party in the Fox Theater. Throughout the week the ladies were welcomed at all the leading theaters of Washington, special tickets having been provided for this purpose.

For the convenience of the visitors, a ladies' headquarters and information bureau was open daily in the Carlton Hotel.

UNIQUE INTERPRETATION AND RECORDING SYSTEM EMPLOYED

A unique and highly successful system of interpretation and recording was employed in all the sessions of the Congress with the exception of the opening plenary session.

Instantaneous interpretation of remarks by means of skilled interpreters and an arrangement of telephone apparatus, together with electrical recording upon wax cylinders of every word spoken greatly simplified the foreign-language problem at the Congress and materially speeded up the proceedings. It was the first time that such a system had been used in a large multilanguage conference in America, and its success was amply attested by the complimentary remarks of numerous official delegates.

Each of the two rooms where the sections of the Congress met was marked off into four zones with signs indicating the zones according to the official languages—English, French, German, and Spanish. Telephone earpieces were supplied to all participants, and the language of interpretation over the telephones in any zone was according to the language of that zone.

In the interest of accuracy and to facilitate procedure, English was selected as the key language for interpretation. However, each speaker was requested to make his remarks in the official language with which he was most familiar. Where the language spoken was other than English, the remarks were first interpreted into English, and this was used as the basis of interpretation into the other two languages, which was made simultaneously.

A feature of the set-up, and this was the first time it was ever tried, was that of electrically recording the proceedings of the Congress, thus eliminating the difficulty and very large expense of importing stenographers capable of taking dictation in foreign languages. This was accomplished by wiring each of the three microphones to the recording device. The voice vibrations from the microphones after amplification actuated electric cutters which cut a hill-and-dale groove in rotating wax cylinders, the depth of the groove depending upon the intensity of the original vibration. When filled these cylinders were sent out to a typing room, where they were placed upon transcribing machines and made to "talk" to typists who had the verbatim utterances in black and white in an astonishingly short time after the close of the session. The recording and reporting of the proceedings were handled in this manner by the Public-Address Recording Service of Washington, under the personal supervision of James C. Marriott.

DAILY BULLETIN OF THE CONGRESS

A daily bulletin was published during the Congress for the benefit of those in attendance in the form of a paper-bound book ranging from 66 to 144 pages. Six issues were printed, from October 6 to October 11, inclusive, and were distributed each morning. All of the material in the daily bulletin, with the exception of the list of congressists present, was printed in each of the four official languages—English, French, German, and Spanish—and thus the proceedings of the Congress were materially clarified and expedited. By means of the bulletin delegates were informed of the progress of the meetings of the sections, announcements of special events held in connection with the Congress, arrangements for receptions and tours, and other items of importance, together with a complete list of all delegates present, revised daily.

The editor of the daily bulletin was Mr. R. E. Royall, senior highway engineer, of the United States Bureau of Public Roads. Mr. G. P. St. Clair, Associate Engineer of Tests, acted as assistant editor.

XVI. REGULATIONS AND BY-LAWS OF THE PERMANENT INTERNATIONAL ASSOCIATION OF ROAD CONGRESSES

I. OBJECT AND ORGANIZATION OF THE ASSOCIATION

ARTICLE 1

The object of the Permanent International Association of Road Congresses is to promote progress in the construction, traffic, and exploitation of roads.

It continues the work of the first International Road Congress held in Paris in October, 1908.

It accomplishes its object—

1. By organizing road congresses.
2. By publishing papers, proceedings, and other documents.
3. By collecting the results of: (a) Tests carried out on roads; (b) laboratory tests throughout the world on materials which are used or are suitable for road construction and maintenance: these tests may be either in the form of mere records collected by the association or they may have been carried out by the association itself or through its instrumentality.

Its affairs are managed by a Permanent International Commission.

ARTICLE 2

The association consists of—

1. Delegates of governments and corporations of all the countries which subscribe annually to the association.

The term "corporation" includes: Public departments; provincial governments; county, district, communal, and municipal bodies; chambers of commerce; scientific or technical institutions; tourist and sporting clubs; professional associations or trade unions; transport companies; agricultural, industrial, and commercial firms, societies, or companies, etc.

The number of delegates is calculated, pro rata, according to the amount of annual subscription.¹ Thus:

One delegate for 250 francs in the case of governments.

One delegate for 100 francs in the case of corporations.

The subscriptions or fraction of subscriptions, inferior to this amount do not give the right to a delegate.

¹ GENERAL NOTE.—All the sums mentioned in the present regulations are expressed in French francs.

2. Of members entered as private members.

The admission is either permanent or temporary.

Permanent members are entitled to attend and vote at every Congress.

Temporary members are entitled to attend the particular Congress they have joined, and they may vote on all questions which do not affect the permanent association itself.

3. Honorary members, nominated by the Permanent International Commission.

ARTICLE 3

1. A Permanent International Commission, with headquarters at Paris, is at the head of the association.

2. A permanent Council and an executive committee are appointed from amongst the members of this commission.

ARTICLE 4

The Permanent International Commission is composed of members belonging to the various countries represented in the association. Each country has the right to one representative for each 1,000 francs of its total annual subsidy:

Provided, however, That the number of representatives from any one country shall not exceed 15, and that any country which pays not less than 250 francs shall have the right to appoint one delegate.

Furthermore, the general presidents, the general secretaries of the road congresses, the honorary members and the old members of the executive committee who have filled their office for six years, are ex-officio members of the Permanent Commission.

At the head of the Permanent Commission there is a President, a Vice President, and a General Secretary, who together constitute the executive committee.

This commission—

1. Determines when and where the first Congress shall be held.

2. Arranges at the proper time for the formation of a local organizing commission at the place selected for the Congress.

3. After consultation with the local organizing commission, determines the languages which shall be officially recognized by the Congress; prepares the agenda and settles the questions to be submitted to the Congress as also the nature and number of the communications it shall deal with; arranges the business of the meetings; and appoints the writers of papers on the several questions.

4. Supports, when necessary, the local commission in its application to foreign governments.

5. Approves the estimates of expenses to be defrayed out of the permanent funds of the association; supervises the financial manage-

ment; and decides, generally, upon all the administrative measures which it considers may promote the work of the Congress.

6. Nominates honorary members.

The commission meets whenever it is convened by the executive committee, or upon the written requisition of a quarter of its members addressed to the president of the executive committee, and, at any rate, at the time of the Congress sessions.

The Permanent International Commission is alone competent to modify the rules; any proposed modification must be put on the agenda of the annual general meeting and adopted by a majority of the members present.

The members of the Permanent Commission, for whom it is not possible to attend a meeting may delegate their powers to one of the members of the commission.

ARTICLE 5

The Permanent Council is composed of representatives chosen from among the members of the Permanent Commission, namely:

One for each country whose annual subsidy does not exceed 5,000 francs.

Two for each country whose annual subsidy exceeds this amount, and is less than 10,000 francs.

Three for each country whose annual subsidy exceeds 10,000 francs.

The President, Vice President, and General Secretary of the Permanent Commission are at the head of the Permanent Council.

The Permanent Council—

1. Carries out the resolutions of the International Commission, and decides upon all questions not expressly reserved for the decision of the commission.

2. Decides upon the admission of corporations and permanent members referred to in article 2.

3. Draws up the estimates to be defrayed out of the permanent funds of the association, and assists and controls the executive committee.

4. After having requested proposals from the local commission the council proceeds to appoint the general committee and sectional committees of the next Congress, appointing as Vice Presidents on each committee three members of the Permanent Commission who are familiar, as far as possible, with the languages officially recognized by the Congress, and it also appoints Secretaries who are well versed in these languages.

5. The council meets whenever convened by the executive committee or upon the request of a quarter of its members addressed to the president of the executive committee.

ARTICLE 6

The executive committee, as stated under article 4, is composed of the President, Vice President, and General Secretary of the Permanent Commission and of the Permanent Council. In addition to an accountant it may employ secretaries who shall be specially intrusted with the translations and a secretary who shall have special charge of the head office for laboratory experiments on materials used in the construction and maintenance of roads.

The members of the executive committee shall belong to the country in which the headquarters of the Permanent Commission are situated.

It collects the records of experiments carried out on roads throughout the whole world and the records of laboratory tests in all countries on materials used in the construction and maintenance of roads; it arranges for fresh experiments to be carried out, and, if necessary, carries them out itself.

It is specially concerned in specifying the conditions which shall be complied with by all those materials, whatever their nature, such as tars, mineral oils, and other kindred products, which are used or can be used practically in the construction and maintenance of roads.

It attends to the dispatch of current business, keeps the accounts, prepares the estimates of expenses to be defrayed out of the permanent funds of the association, keeps the expenses within the limits of each heading of the approved estimates, signs checks, and collects subscriptions and all other moneys due to the association.

It deals with all investigations, tests, and occasional or periodical publications decided upon by the Permanent Council or by the Permanent Commission.

It has charge of the library, archives, documents, and accounts.

It translates, when necessary, publishes and transmits to the members of the Congress the papers, communications, and proceedings of the Congress.

It shall administer the funds of the association and invest them at the bank, in bonds of the French Government, in debentures of the railways guaranteed by the French State, or in debentures of the premium bonds of the Credit Foncier de France and of the city of Paris, or else in foreign bonds guaranteed by a state which is a member of the association. It shall represent the association in all judiciary actions.

ARTICLE 7

The representatives of the various countries, both on the Permanent Commission as well as on the Permanent Council, are appointed by the governments of the respective countries in the proportions stated in articles 4 and 5.

It devolves upon the government of each country, whenever occasion arises, to fill vacancies which may occur amongst their representatives on the commission or on the Permanent Council, through death or through the expiry of their term of office.

ARTICLE 8

Each Congress entails the appointment of a local organizing commission which includes the local members of the Permanent Commission and holds office till the close of the Congress.

This commission includes committees of patronage, administration, reception, excursion, and others.

It undertakes the propaganda in the country where the Congress is to be held, and, in accord with the Permanent Council, selects persons in that country for presidents and members of the committees and sectional committees of the Congress.

It draws up, in consultation with the Permanent Council, the detailed program of the meetings, and distributes it to all the members of the Congress at the opening of the session.

It organizes the various excursions, receptions, and fêtes.

It provides the rooms in which the meetings are held.

It advises the Permanent Commission on the languages which may be officially recognized by the Congress and on the translations which have to be made for the session; the language of the country in which the Congress is held will have to be admitted if required by the local commission.

It organizes the service of correspondence, lodgings, interpreters, and helps, where necessary, the Permanent Commission in arranging at the expense of the association for the translation and printing into the language of the country where the Congress is held of papers which have been written in any of the other languages officially recognized by the Congress.

Conversely it arranges, at the expense of the association, for the translation into any of the other languages recognized by the Congress of papers which have been written in the language of the country where the Congress is held.

It puts the Permanent Commission into touch with the local authorities.

It presides over and conducts the session of the Congress.

The subscription of each temporary member is 125 francs, of which 50 francs are earmarked for the association and the balance of 75 francs is the property of the Local Organizing Commission to help toward its expenses. The latter is also entitled to the special temporary grants and subsidies received from governments, corporations, and private men and, if need be, to grant from the association.

It will collect the whole of the 125 francs subscription, and remit direct to the association the share to which the latter is entitled.

It will keep special accounts of the subsequent grant of the association and will not be at liberty to spend more than the amount in question without written authority from the executive committee.

ARTICLE 9

The permanent funds of the association are derived from:

1. The annual grants from governments and corporations.
2. The subscriptions of private permanent members, which are as follows, from the 1st of January, 1929:

(a) Permanent membership involves an annual subscription of 25 francs. This subscription is increased to 125 francs for the first year in the case of permanent members who are enrolled during a Congress year.

(b) By a single payment of 500 francs private permanent members may convert their annual membership to a life membership; this does not apply to corporations.

(c) Honorary members pay no subscription.

3. Various donations and gifts.

ARTICLE 10

1. The financial year commences on the 1st day of January.

2. Subscriptions are payable as follows:

Permanent members, at the time of enrollment and on January of each year, in advance, to the office of the executive committee.

Temporary members, at the time of enrollment, to the office of the local organizing commission.

The expenses of collection must be borne by the members.

Special subscriptions may be solicited by the local organizing commission from the members who take part in the excursions and fêtes during the Congress. Participation in these is optional and the number of the participants may be limited.

ARTICLE 11

Every member is entitled—

1. To take part in the meetings of the Congress and to vote upon all questions figuring on the agenda.

2. To receive the publications of the Congress in any one of the languages recognized by the Congress which he may select. The association is not bound, however, to replace copies which are lost or damaged in transit.

The delivery of these publications to those temporary members who have not registered their names at least one month before the Congress can not be guaranteed.

Permanent and honorary members are further entitled—

(a) To lay before the Permanent Commission any questions to be submitted to the Congress. Such questions, accompanied by a concise report giving reasons for the same, must reach the commission at least one year before the meeting of the Congress.

(b) To vote on all questions depending on the Permanent Association at the meetings of the Congress or at the special meetings.

(c) To receive the publications distributed by the association at other times than during the sessions of the Congress.

The number of copies of the publications delivered to governments and corporations is determined according to the number of their delegates. (Arr. 2.)

The corporations which, without paying the minimum annual subscription of 100 francs, which gives the right of nominating a delegate to the Congresses (Arr. 2), desire nevertheless to receive a copy of all the publications, may obtain them on the payment of an annual sum of 50 francs.

ARTICLE 11a

A bulletin of the Permanent International Association of Road Congresses is published by the executive committee at least every three months.

This bulletin is edited and published under the stipulations of articles 1, 6, 11, and 15 of these regulations. It consists of similar editions, in German, English, and French.

Manuscripts sent for insertion in the bulletin are examined by the executive committee, who have power to accept or refuse them; its decision is final and can only be set aside by the permanent council.

Notice of the refusal to print or accept an article must be given the author by registered letter within one month from the date of reception of the article by the executive committee.

Extracts from journals or reviews must always mention their source very precisely.

In no case can the permanent commission, the permanent council, or the executive committee accept responsibility for the opinions and theories of authors; neither can they enter into the question of copyright or priority of publication.

Any member of the association who shall have sent in an article for insertion in the bulletin will be deemed to accept the following conditions if his article is accepted.
temporary
and pr.

1. Articles must not be sent to other publications at the same time that they are sent to the executive committee for publication in the bulletin.

2. These articles must not be reproduced in extenso in any periodical or nonperiodical publication before at least three months have elapsed after their publication in the bulletin of the association. When reproduced, mention must always be made of the origin of the articles.

3. The executive committee reserve the right of inserting a special notice at the author's request to the effect that any particular article which has appeared in the bulletin must not be translated nor reproduced, even after the three months' delay hereinbefore mentioned, for a maximum period of three years.

Notification of the above stipulations will be made by the executive committee to the authors of articles for the bulletin at the time when their work is accepted.

II. SESSIONS OF THE CONGRESS

ARTICLE 12

The Permanent Commission convenes the Congress from time to time, at intervals of about three years, as nearly as possible.

ARTICLE 13

1. The Congress comprises:

Two Sections, one for the construction and maintenance of roads and the other for traffic and exploitation.

These Sections may be subdivided.

2. Its proceedings consist of general meetings, sectional meetings, excursions, and receptions.

The number and nature of the questions to be discussed by the Congress are settled by the Permanent Commission. This commission also settles the number and nature of communications which may be submitted to the Congress in addition to the ordinary program of questions.

As a general rule each country shall furnish only one paper on any given "Question" or topic of a "Communication."

ARTICLE 14

The Reporter, or Reporters, selected by the Commission for the given question or topic of a communication and for any given country, shall collect in that country all the data needed for the preparation of their paper.

Their work, supported by conclusions if they deem these desirable, should reach the executive committee, at the latest, 10 months before the opening of the Congress.

The Permanent Commission appoints a General Reporter for each question, whose duty shall consist of submitting to the Congress a short review of the chief features of this question, together with a summary of the papers which have been transmitted to him.

The General Reporter may give his own views and data, and he may arrange with the various authors of papers for formulating joint proposals. As far as possible he shall belong to the country in which the Congress is held.

ARTICLE 15

The papers upon each "Question" and also the general reports must be forwarded to the executive committee within the limit of time allowed to their authors; they will be translated and printed in the official languages of the Congress.

The papers must be delivered to the General Secretary written in one of the official languages of the Congress, on the recto of the sheets only, in three typewritten copies.

Each paper should not exceed about 8,000 words, the number of illustrations inserted in the text should not exceed six, and the total area occupied by them should not exceed 300 square centimeters.

The plates separate from the text (either drawings or halftones) should not exceed two in number, except in special cases. Their size should not exceed 23.8 centimeters in depth by 45 centimeters in width, including the border line (or 22 centimeters by 43 centimeters within the border line).

The drawings should be made in clear black lines on tracing paper so as to allow blocks to be made from them if necessary.

Except by special decision of the Permanent International Commission, each communication must be confined to 5,000 words, and three illustrations in the text not exceeding 150 square centimeters in all, and one plate apart from the text.

The papers dealing with the subjects of communication are to be translated into the official languages of the Congress. They will not give rise to a general report and will only be discussed at the meetings of the Congress if time permits after the program of questions has been completely threshed out.

Beyond the communications referred to in the above articles 13 and 14, which are printed at the expense of the association, the Permanent Commission may admit communications printed by their authors at their own expense; in the required number of copies

must be supplied to the executive committee, and furthermore they will not be voted upon, nor brought up for consideration at a general meeting.

Writers of papers upon "Questions" or "Communications," may, if they wish, furnish their own translations into the various official languages of the Congress.

ARTICLE 16

The "Questions" are first discussed at the sectional meetings and afterwards at a general meeting.

ARTICLE 17

1. The deliberations, either at general meetings or at sectional meetings, are conducted in the languages officially recognized by the Congress, and also, when required, in the language of the country where the Congress is held.

The speakers, however, are authorized to use their own language under the express condition of translating or causing to be translated the words spoken into one of the three accepted languages of the Congress. This translation will appear in the transactions provided for under article 20, and the original speech will only be mentioned as having taken place.

2. Unless otherwise decided by the meeting, persons taking part in the discussions are not allowed to speak for more than 10 minutes, nor can they address the same meeting more than twice upon the same subject unless the meeting, on being consulted, decides otherwise.

3. The discussion in sectional meetings or in general meeting will be preceded for each question by a brief summary of the reports by the General Reporter who has been appointed under the terms of article 14.

After discussing each question submitted to it, each Section may appoint one or more reporters to support in the general meeting the conclusions they have adopted.

ARTICLE 18

Members of the Congress who have spoken at a meeting must, within 24 hours, deliver to the sectional committee a summary of their remarks, to enable a report of the proceedings to be drawn up.

In the case where the summary has not been submitted, the wording adopted by the secretary or even the mere heading will be mentioned instead.

The committee shall have the right to request the author to abridge his summary, and should it be revised and amended in due time, the committee judgment.

ARTICLE 19

The summary of the discussions, arranged and edited by the sectional committees, together with the various conclusions adopted by the majority of the members voting, are transmitted by the General Reporter to the permanent council the day before the last general meeting and they are then laid before the latter where they are discussed and voted upon.

ARTICLE 20

A detailed report of the proceedings of each section of the Congress is prepared by the executive committee assisted by the committee of the Congress and especially by the Vice Presidents and Secretaries mentioned in article 5.

As regards the general meetings and excursions, a similar report is prepared by the General Secretary of the session within the shortest time.

The joint record so compiled is published, under the direction of the executive committee, in the languages officially recognized by the Congress.

III. DISSOLUTION OF THE ASSOCIATION

ARTICLE 21

The dissolution of the association can only be effected at a Congress specially convened for the purpose, and must be approved by a majority of three-fourths of the members present and entitled to vote.

ARTICLE 22

1. In the event of its dissolution, the liquidation of the accounts of the association shall be undertaken by the Permanent Commission.

2. The final assets of the association shall, under its guidance, be devoted to philanthropic or technical objects relating to roads.

XVII. LIST OF MEMBERS

XVII. LISTA DE LOS MIEMBROS

THE PERMANENT INTERNATIONAL COMMISSION

LA COMISIÓN PERMANENTE INTERNACIONAL

HONORARY MEMBERS—MIEMBROS HONORARIOS

MM. BALLIF (A.), Ancien Président du Touring-Club de France, Ancien Vice-Président du Bureau Exécutif de l'Association Internationale Permanente des Congrès de la Route, à Paris.
DEFERT (H.), Président honoraire du Touring-Club de France, 65, avenue de la Grande-Armée, Paris.

EXECUTIVE BUREAU—JUNTA EJECUTIVA

President—Presidente

M. MAHEU, Sénateur, Inspecteur Général des Ponts et Chaussées, à Paris.

Vice President—Vicepresidente

M. CHAIX (Edmond), Président du Touring-Club de France, 65, avenue de la Grande-Armée, Paris.

General Secretary—Secretario General

M. LE GAVRIAN (P.), Inspecteur Général des Ponts et Chaussées, Professeur à l'École Nationale des Ponts et Chaussées, à Paris.

EX OFFICIO MEMBERS—MIEMBROS EX-OFFICIO

General Presidents of Congresses—Presidentes Generales de los Congresos

Second Congress, Brussels, 1910.—Segundo Congreso, Bruselas, 1910.—M. le Chevalier LAGASSE DE LOCHT, Directeur Général Honoraire des Ponts et Chaussées, 167, chaussée de Wavre, Bruxelles.

Fourth Congress, Seville, 1923.—Cuarto Congreso, Sevilla, 1923.—Sr. D. A. VALENCIANO Y MAZERES, Ingeniero Jefe de Caminos, Canales y Puertos y Abogado, Administrateur Conseiller de la Compagnie du Chemin de Fer de Madrid, Saragosse et Alicante, Madrid.

Sixth Congress, Washington, 1930.—Sexto Congreso, Washington, 1930.—Mr. ROY D. CHAPIN, National Automobile Chamber of Commerce, Detroit, Mich.

General Secretaries of Congresses—Secretarios Generales de los Congresos

Messrs. (MM.)—

First Congress, Paris, 1908.—Primer Congreso, Paris, 1908.—HEUDE (Henry), Inspecteur Général des Ponts et Chaussées en retraite, ancien Professeur à l'École Nationale des Ponts et Chaussées, 127, boulevard Saint-Germain, Paris.

Second Congress, Brussels, 1910.—Segundo Congreso, Bruselas, 1910.—WALIN, Directeur Général honoraire des Ponts et Chaussées, 56, rue des Eburons, Bruxelles.

Third Congress, London, 1913. - Third Congress, Londres, 1913.—REES JEFFREYS (William), Chairman of the Roads Improvement Association, 180, Clapham Road, London, S. W. 9.
Fourth Congress, Seville, 1921. - Cuarto Congreso, Sevilla, 1923.—LUIS PROTA, Jefe de Administración, Ministerio de Fomento, Madrid.
Fifth Congress, Milan, 1926. - Quinto Congreso, Milán, 1926.—LOMI (Guido), Ispettore superiore del Genio Civile, 4, via Besana, Milan.
Sixth Congress, Washington, 1930. - Sexto Congreso, Washington, 1930.—MACDONALD (Thomas H.), Chief, Bureau of Public Roads, U. S. Department of Agriculture.

MEMBERS—MIEMBROS

French Equatorial Africa - Africa Equatoriale Française

(Not designated—Nombre inasquible)

French West Africa - Africa Occidentale Française

REAU, Ingénieur des Ponts et Chaussées, Ingénieur en chef adjoint à l'Inspecteur Général des Travaux publics des Colonies, Ministère des Colonies, Paris.

Algeria - Argelia

VICAT, Inspecteur Général des Ponts et Chaussées, Inspecteur Général des Services des Travaux Publics de l'Algérie, Alger.

Germany - Alemania

Ministerialrat, Geheimer Regierungsrat Dr. Ing. E. H. PRAGA, Reichsverkehrsministerium, Wilhelmstr. 86a, Berlin W. 8.
 Oberregierungsrat SCHULZE, Reichsverkehrsministerium, Berlin W. 8.
 Ministerialdirektor, Geheimer Oberregierungsrat Dr. HELLEN, Preussisches Ministerium für Landwirtschaft, Domänen und Forsten, Berlin W. 9.
 Magistratsoberbaumeister LÖSCHMANN, Magistrat, Berlin.
 Ministerialrat a. D. von SCHMIDT, Unter den Eichen, 12-13, III, Berlin W. 8.
 Kreisbaumeister KRAMANN, Alexandriner 1, Berlin N. W. 40.
 Landbaumeister, Präsident Dr. Ing. WILCKE, Matthäikirchstr. 17, Berlin W. 10.
 Stadtbaurat Dr. Ing. LISKER, Neues Rathaus, Dresden.
 Oberregierungsrat PAULSEN, Preussisches Ministerium des Innern, Berlin N. W. 7.
 Ministerialrat VILBIG, Bayerisches Staatsministerium des Innern, München.
 Ministerialrat Dr. Ing. SEICKE, Sächsisches Finanzministerium, Dresden.
 Präsident ECKSTEIN, Württembergisches Innenministerium, Abteilung für Strassen- und Wasserbau, Stuttgart.
 Ministerialdirektor Dr. Ing. FRENZ, Badisches Finanzministerium, Karlsruhe.
 Oberbaudirektor LEO, Baudeputation I, Hamburg.
 Oberbaumeister Dr. Ing. E. H. NAGEL, Baudirektion, Braunschweig.

Argentina

GRANDE (José), Ingénieur civil, 16, rue Franklin, Paris (16^e).

Australia

(Not designated—Nombre inasquible)

Austria

SCHNEIDER (Gustave), Ingénieur, Conseiller au Ministère fédéral du Commerce et des Communications, Stubenring 1, Wien 1.

Belgium—Belgica

DELMEN (A.), Secrétaire Général du Département des Travaux publics, 38, rue de Louvain, Bruxelles.
 CHRISTOPHE (P.), Directeur Général des Routes et des Bâtiments, 38, rue de Louvain, Brux.
 BOUENHOOM, Inspecteur Général des Travaux publics (Voie communale), 2, rue du Méridien, Bruxelles.
 D'UNSEL (Duc), Président du Comité National de Belgique, rue du Marché-au-Bois, Bruxelles.

Brazil—Brasil

FRAGOSO DE LIMA CAMPOS (Arthur), Ingénieur en Chef de la Inspectoria federal de Obras contra as Seccas, 36, rue Humayta, Rio de Janeiro.
DA SILVA FREIRE (Victor), Directeur du Service de la Voirie de la Municipalité de São-Paulo.

Bulgaria

PATCHEFF (Nicolas), Ingénieur, Directeur général au Ministère des Travaux Publics, Sofia.

Chile

AMUNÁTEGUI (Francisco), Ingénieur, Délégué du Chili à la Commission des Communications et du Transit à la Société des Nations, 29, avenue Hoche, Paris.

China

K. Y. Woo, Directeur du "European Bureau of the Ministry of Railways of the National Government of the Republic of China," 5, rue de Mogador, Paris.

Cuba

ORTEGA Y ROS (Pablo), Ingénieur, Calle 19, no. 123, Vedado, La Havane.

Denmark—Dinamarca

MADSEN (Lieutenant-Colonel L.-A.), Inspecteur Général des Ponts et Chaussées, Christiansborgslot, Copenhagen.

Egypt—Egipto

Abdel Aziz GHALEB, Premier Secrétaire de la Legation royale d'Egypte, 9, rue La Pérouse, Paris.

Spain—España

DE ALBACETE (Francisco), Ingeniero Jefe de la Provincia de Madrid, Calle de Serrano, no. 106, Madrid.
HERNANDEZ BAYARRI (Antonio), Ingeniero Jefe de Caminos, Canales y Puertos, Ministerio de Fomento, Madrid.
OCHANDO Y VALERA (Ramón), Ingeniero Jefe de Caminos, Canales y Puertos, Valencia.

United States—Estados Unidos

CARR (Hon. Wilbur J.), Assistant Secretary, State Department.
COOPER (William L.), Director, Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, D. C.
FINGER (William L.), Automotive Trade Commissioner to Europe, 5, rue de Chaillot, Paris.
MACDONALD (Thomas H.), Chief, Bureau of Public Roads, United States Department of Agriculture, Washington, D. C.
BLOOD (Henry H.), President, American Association of State Highway Officials; Chairman, State Roads Commission, Salt Lake City, Utah.
VAN DUZER (William A.), President, American Road Builders' Association; Assistant Chief Engineer, Pennsylvania Department of Highways, Harrisburg, Pa.
ROWE (Dr. L. S.), Director General, Pan American Union, Washington, D. C.
CHAPIN (Roy D.), National Automobile Chamber of Commerce, Detroit, Mich.
JOHNSON (Pyke), Washington Representative, National Automobile Chamber of Commerce, Washington, D. C.
BISHOP (Dean F. L.), University of Pittsburgh, Pittsburgh, Pa.
BARBER (Col. A. B.), Chief, Transportation and Communication Department, U. S. Chamber of Commerce, Washington, D. C.
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- 985 WANDSWORTH METROPOLITAN BOROUGH COUNCIL, Town Hall, Wandsworth S. W.
- 805 WARWICKSHIRE COUNTY COUNCIL, County Surveyor, 8 Northgate Street, Warwick.
- 673 WESTERN AUSTRALIA, Savoy House, Strand, London W. C. 2.
- 824 WHITE STAR LINE, Passenger Traffic Department, Royal Mail House, Leadenhall Street, London E. C. 3.

- 983 WIMBLEDON (BOROUGH OF), Town Hall, Wimbledon S. W. 9.
 768 WOOLWICH (METROPOLITAN BOROUGH OF), Town Hall, Woolwich,
 London S. E. 18.
 632 WORSHIPFUL CO. OF PAVIORS, 14-15 Coleman Street, London E. C. 2.
 1000 YEOVIL RURAL DISTRICT COUNCIL, Council Offices, 28 Kingston,
 Yeovil.

GREECE—GRECIA

- 905 CAISSE SPÉCIALE DE CHAUSSÉES PERMANENTES D'ATHÈNES,
 (Caisse spéciale M. O. A.), Ministère des Communications, Athènes.
 710 ÉCOLE POLYTECHNIQUE D'ATHÈNES.
 3556 GROTE & CO., 16 Valaoritou Str., Athènes.
 943 SOCIÉTÉ A. K. T. E., 83 Rue de l'Université, Athènes.
 942 SOCIÉTÉ ANONYME ASPHALTICA ERGA, 18 Rue de Bucarest,
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 945 SOCIÉTÉ ANONYME ERGOLIPTIKI, Rue Psamatzoglou 1, Athènes.
 946 SOCIÉTÉ ANONYME DE CONSTRUCTIONS KADMOS, Rue de
 l'Académie, Athènes.
 941 SOCIÉTÉ ANONYME DE ROUTES ET DE CONSTRUCTIONS
 ERGON, Rue Andreou London, Athènes.
 955 TECHNIKON EPIMELITIRION (Chambre technique de la Grèce),
 Rue de l'Académie, Athènes.
 939 VILLE D'ATHÈNES.
 940 VILLE DU PIRÉE.

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- 842 ASSOCIATION NATIONALE HONGROISE DES FABRICANTS
 DE CIMENT ET DES BRULERS DE CHAUX, Zoltan utca 2/4,
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 VIDA (Eugène).
 703 AUTOMOBILE-CLUB ROYAL HONGROIS, 1 Place Apponyi, Budapest
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 856 EPITOIPAR RESZVENYTARSASAG, VII. Baross utca 15, Budapest.
 3551 MAGYAR TOURING-CLUB, Deak Ferenc- u. 10 I, Budapest.
 HORTHY (Etienne de), Ingénieur, Vice-Président.
 791 SECTION DES PROPRIETAIRES DE CARRIERES, membre de l'Union
 des Fabricants hongrois, V. Zrinyi utca 1, Budapest.
 828 TEER U. BITUMENANLAGE DER HAUPTSTADT BUDAPEST
 (Service municipal de bitume et de goudron), Bihar utca 4, Budapest X.
 752 UNGARISCHE ASPHALT ACTIEN GESELLSCHAFT, Nador utca 4,
 Budapest.

BRITISH INDIA—INDIA BRITÁNICA

- 880 GOVERNMENT OF ASSAM, Public Works Department, Shillong.
 872 GOVERNMENT OF BENGAL, Public Works Department, Communi-
 cations Branch, Calcutta.
 780 GOVERNMENT OF BIHAR AND ORISSA, Public Works Department,
 Patna.
 876 GOVERNMENT OF BOMBAY, Bomhay Castle, Bombay.
 831 GOVERNMENT OF BURMA, Public Works Department, Building and
 Roads Branch, Rangoon.
 793 GOVERNMENT OF THE UNITED PROVINCES, Public Works
 Department, Buildings and Roads Branch, Lucknow.
 611 THE ASTATIC PETROLEUM CO. (INDIA). (LTD.), 10 Clive Street,
 Calcutta.

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- 720 NEDERLANDSCH-INDISCHE WEGENVEREINIGUNG, p/a Tech-
 nische Hoogeschool, Bandoeng (Java).
 5073 HOOFD PROVINCIALE WATERSTAATSDIENST OOST-JAVA,
 Gouverneurskantoor, Soerabain.

- 5074 HOOFD PROVINCIALE WATERSTAATSDIENST WEST-JAVA, Entrée Gondangdia, Batavia, Weltevreden.
 3555 PROVINCIALE WATERSTAAT WEST JAVA, Gebouw Bouwploeg, Entrée Gondangdia, Weltevreden.

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- 3502 CIRCONSCRIPTION TERRITORIALE DES TRAVAUX PUBLICS DE COCHINCHINE, Saigon.
 913 INSPECTION GENERALE DES TRAVAUX PUBLICS D'INDO-CHINE, Hanoi.
 614 THE ASIATIC PETROLEUM CO., (STRAITS SETTLEMENTS), (LTD.), St. Helens Court, Singapore (Indo-Chine anglaise).

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 839 AMMINISTRAZIONE PROVINCIALE DI CAGLIARI.
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 3550 ASSOCIAZIONE NAZIONALE FASCISTA FRA INDUSTRIALI DELL' AUTOMOBILE, Via Guicciardini 3, Torino.
 849 AZIENDA DELLE TRAMVIE DEL GOVERNATORATO DI ROMA, Via Volturmo 59, Roma.
 795 COMPAGNIA ITALIANA WESTINGHOUSE, Freni e Segnali, Via Pier Carlo Boggio 20, Torino 105.
 708 COMUNE DI MILANO, Direzione Lavori e Servizi Pubblici, Divisione Strade, Milano.
 623 COMUNE DI ROMA (Ufficio tecnico Municipale), Via Monte Tarpeo 38, Roma.
 CONTE (Ugo) Ingegnere Capo, Servizio Strade, Roma.
 885 COMUNE DI SANREMO, Prov. di Imperia.
 687 CUGINI PRAGA, Stabilimenti Asfaltici, 7 Via Pasquirolo, Milano 4.
 3511 ENTE NAZIONALE INDUSTRIE TURISTICHE, Via Marghera N°6, Roma.
 948 FRATELLI ZABBAN & CO., Casella postale 138, Bologna.
 891 IMPRESA DI COSTRUZIONI Francesco & G. PAROLETTI, Via Giovanni Chiassi 3, Brescia.
 776 RA. SCUOLA DI INGEGNERIA R. POLITECNICO, Piazza Cavour 4, Milano.
 400 REALE AUTOMOBILE CLUB D'ITALIA, Via Po 17, Roma.
 3508 SOCIETÀ ANONIMA PER COSTRUZIONE E MANUTENZIONE STRADE, Piazza Poli 37, Roma 101.
 949 SOCIETÀ ANONIMA IMPRESE GENERALE, Via Romagnosi 3, Milano.
 929 SOCIETÀ ANONIMA PORFIDI D'ITALIA, Via Principe Umberto N° 28, Milano.
 581 SOCIETÀ ANONIMA PURICELLI, Strade e cave, Via Monforte 44, Milano 13.
 866 SOCIETÀ ANONIMA V. A. I. (Vetture Autoelettriche Italiane), Piazza di Spagna 20, Roma.
 840 SOCIETÀ ITALIANA DELLE MINIERE DI SELENIZZA, Corso Umberto 1°, n° 262, p. 2°, Roma.
 956 SOCIETÀ ITALICA MESSICANA PETROLII & ASFALTI, Via della Rocca 49, Torino.
 SAN GERMANO (Casimiro de), Amm. del.
 689 SOC. NAFTA, Società italiana per il petrolio ed affini Reparto XI, Via Martin Piaggio No. 1, Piazza Corvetto, Genova.
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 305 TOURING-CLUB ITALIANO (ISTITUTO SPERIMENTALE STRADALE), 10 Corso Italia, Milano.

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- 3515 DORO KENKYU KWAI, 75 Asagaya Suginami-Machi, Tokyo.
 522 OSAKA CITY (DEPARTMENT OF CIVIL ENGINEERING).

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- 845 AUTOMOBILE-CLUB LUXEMBOURGEOIS, Grand' Rue 66, Luxembourg.
 954 SOCIÉTÉ ROUTIÈRE HOFFMANN, WERNER & C°, 6 Rue Wedel, Luxembourg.

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- 672 CASABLANCA (2ÈME ARRONDISSEMENT DES TRAVAUX PUBLICS DE), SERVICE DES ROUTES, DIRECTION GÉNÉRALE DES TRAVAUX PUBLICS, Casablanca.
 953 DIRECCIÓN DE OBRAS PÚBLICAS Y MINAS DE LA ZONA DEL PROTECTORADO ESPAÑOL EN MARRUECOS, Tetuán.
 911 SOCIÉTÉ MAROCAINE DE CYLINDRAGE ET DE REVÊTEMENT DES ROUTES, 49 Rue Léon l'Africain, Casablanca.
 404 TANGER (SERVICE DES TRAVAUX PUBLICS).

MEXICO

- 566 ASOCIACIÓN DE INGENIEROS Y ARQUITECTOS DE MÉXICO, Callejón del Cinco de Mayo 25, Apartado postal 20-57, México.

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- 413 SOCIÉTÉ ANONYME DES BAINS DE MER ET DU CERCLE DES ÉTRANGERS, Monte-Carlo.

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- 684 BERGEN (VILLE DE).
 548 KONGELIG NORSK AUTOMOBIL KLUB, Drammensveien 20/24, Oslo.

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- 893 THE PALESTINE SILICATE CO. (LTD.), P. O. B. 35, Tel-Aviv.

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- 307 A. N. W. B. TOURING-CLUB DES PAYS-BAS, Parkstrand 18, 's Gravenhage.
 697 DE BATAAFSCHE PETROLEUM MAATSCHAPPY, Carel van Bylandtlaan 30, 's Gravenhage.
 GREUTERT (Jacques).
 853 HOLLANDSCHE BETON MAATSCHAPPY, 258 Groot Hertoginnelaan, 's Gravenhage.
 VAN VLIET (W. N.).
 372 INSTITUT ROYAL DES INGÉNIEURS NÉERLANDAIS, 23 Princessegracht, 's Gravenhage.
 745 PROVINCIAAL BESTUUR VAN NOORDHOLLAND, Haarlem.
 843 PROVINCE D'UTRECHT, Achter St.-Pieter 20, Utrecht.
 850 TECHNISCH BUREAU VAN OORT & VAN DEN ZEE, Ingénieurs-conseils, Herman Collinussstraat 17, Groningen.
 VAN OORT (W. K.).
 562 VEREENIGING HET NEDERLANDSCHE WEGENCONGRES, Parkstraat 18, 's Gravenhage.
 655 VILLE DE ROTTERDAM, Stadstimmerhuis, Haringsvliet 4, Rotterdam.
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 340 VILLE DE LA HAYE (DIRECTION DES TRAVAUX PUBLICS).

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5076 GOVERNMENT OF PHILIPPINE ISLANDS.

FRAGANTE (Vicente), Highway Engineer, Bureau of Public Works, Manila.

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552 AUTOMOBILKLUB POLSKI, 10 Aleja Szucha, Warszawa.

669 CRACOVIE (Magistrat de), Hôtel-de-Ville, Krakow.

731 DIETINE DU DISTRICT DE VARSOVIE, Sejmik Warszawski, 15 Rue Długa, Warszawa.

938 DIETINE DU DISTRICT DE ZAWIERCIE, Wydział Powiatowy w Zawiercie, Zawierecie.

WOJEW (Kieleckie).

829 KOMIENIOŁOMY MIAST MALOPOLSKICH, Rue Grodzka 40, Krakow.

3526 STOWARZYSZENIE CZŁONKOW POLSKICH KONGRESOW DROGOWYCH, Depart. Drogowy, Minist. Robot Publicznych, Kredytowa 9, Warszawa.

906 USINE POLONAISE DES EXTRAITS DE TANNERIE (POLSKA FABRYKA EKSTRAKTOW GARBARSKICH), Smocza 43, Warszawa.

707 VILLE DE VARSOVIE.

934 ZWIAZEK POLSKICH FABRYK PORTLAND CEMENTU, Dział propagandy technicznej, Aleje Jerozolimskie 47, Warszawa.

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771 ASSOCIAÇÃO DOS ENGENHEIROS CIVIS DO NORTE DE PORTUGAL, Praça da Liberdade 114, Porto.

647 AUTOMOVEL-CLUB DE PORTUGAL, Largo do Calhariz 29, Lisboa.

603 CAMARA MUNICIPAL DE PORTO, 3a Repartição tecnica, Porto.

739 INSTITUTO INDUSTRIAL DE LISBOA, Rua de Buenos Aires, Lisboa.

931 JUNTA AUTONOMA DE ESTRADAS, Largo da Abegoaria 29-1, Lisboa.

3504 SAMPAIO BAPTISTA Limitada, Rua dos Correiros 113-1º, Lisboa.

959 SOCIEDADE INDUSTRIAL DE PAVIMENTAÇÃO E OBRAS Lta., Rua de S. Paulo 55, 2º Esq., Lisboa.

RUMANIA

3539 ASTRA ROMANA, 10 Boulevard Carol, Bucuresti.

393 AUTOMOBILE-CLUB ROYAL ROUMAIN, Bucuresti.

3528 CAISSE AUTONOME DES ROUTES D'ÉTAT, Ministère des Travaux Publics, Bucuresti.

HOISESCO (Nicolas), Ingénieur, Inspecteur Général Directeur de la Caisse Autonome.

PROFIRI (Nicolas), Ingénieur en chef Directeur.

STEFAN (Nicolas R.), Ingénieur en chef Directeur.

CAPSA (G.), Ingénieur, Membre du Conseil d'Administration de la Caisse Autonome, Professeur à l'École Polytechnique de Bucarest.

769 SOCIÉTÉ BITUMEN, Entreprise roumaine d'asphalte, Str. Bratiani I a, Oradea.

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838 AKTIENBOLAGET A. K. FERNSTROMS, Granitindustrier, Karlshamn.

362 KUNGL. AUTOMOBIL KLUBBEN, S. Blasieholmshamnen 6, Stockholm.

657 SVENSKA TEKNOLOGFORENINGEN, Stockholm 16.

WRETLIND (E. P.).

490 SVENSKA VAGFORENINGEN, Gamla Kungsholmsbrogatan 32, Stockholm.

SODERGRAN (J.), Chief Engineer.

- 714 SVENSKA VAGINSTITUTET, Statens Provvningsanstalt, Stockholm.
 VON MATERN (N.), Ingénieur civil, Secrétaire de l'Institut.
 WRET Lind (E. Paul), Ingénieur civil, membre de la Direction de l'Institut.
 575 VASTRA SVERIGES, Gatstensindustriidkareforbund, S. A. F. Kungsportsavenyen 1, Göteborg.

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- 827 AUTOMOBILE CLUB DE SUISSE, 16 Rue du Mont-Blanc, Genève.
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 418 CANTON DE ZÜRICH (BAUDIREKTION).
 702 EINGETRAGENE GENOSSENSCHAFT PORTLAND (Commission des Rontes en béton), Seidengasse 9, Zürich.
 693 INTERNATIONALES STEINARBEITER SEKRETARIAT, Uetlibergstr. 21, Zürich III.
 750 M. M. BRUN & CIE., Fabrique de machines pour entreprises, Nelikon, Luzern.
 619 SOCIÉTÉ "LE VIALIT," Bacholdstrasse 7, Zürich.
 917 THE VAL DE TRAVERS ASPHALT PAVING CO. LTD., Travers.
 402 VEREINIGUNG SCHWEIZ. STRASSEN-FACHMANNER, Bahnhof-quai 7, Zürich.
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 674 VILLE DE LAUSANNE (DIRECTION DES TRAVAUX).
 306 VILLE DE ZÜRICH.

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- 3546 SERVICE DES TRAVAUX PUBLICS DE L'ÉTAT DE SYRIE, Région Nord, Alep.
 3516 SHELL CO. OF SYRIA (LTD.), Shell House, Beyrouth.

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- 841 AKCIOVA SPOLECNOST PRO ASFALTOVANI A STAVBU SILNIC, Mostova ul. 6, Bratislava.
 541 AUTOKLUB REPUBLIKY CESHOSLOVENSKE, Praha I.
 542 BEZIRKSVERWALTUNGS KOMMISSION, Karlsbad.
 524 COMITE EXECUTIF DU PAYS DE BOHÈME (Section des Ponts et Chaussées), Praha III/6.
 3540 KONSTRUKTIVA A. S. PRO SILNICNI STAVBY V PRAZE, Spalena 27, Praha II.
 898 KRALODVORSKA CEMENTARNA AKCIOVA SPOLECNOST, II Jeana 39, Praha.
 537 MESTSKÝ STAVEBNÍ URAD, Brno.
 3545 SILSTRA SPOLECNOST PRO STAVBY SILNICNI, Veletzui 55, Praha VII.
 900 SLOVENSKA KRAJINA SILNICNE ODDELENIE, Bratislava.
 725 SOCIÉTÉ "TEERAG," Vltkova 4, Praha Karlín.

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 535 COMPAGNIE DU GAZ ET RÉGIE CO-INTERESSEE DES EAUX DE TUNIS, 122 Rue de Serbie, Tunis.
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 568 VILLE DE BIZERTE.

U. S. S. R.—U. R. S. S.

- 933 DIRECTION CENTRALE DES TRANSPORTS LOCAUX DU COMMISSARIAT DU PEUPLE DES VOIES DE COMMUNICATION, C. U. M. T., N. K. P. S., Moscow.

URUGUAY

- 5021 DIRECCIÓN DE OBRAS PÚBLICAS MUNICIPALES DE MONTEVIDEO, 18 de Julio 1112, Montevideo.

YUGOSLAVIA—YUGOESLAVIA

- 878 ENTREPRISES GÉNÉRALES DES TRAVAUX PUBLICS L. I. D., Kralja Milano 7, Beograd.

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- 2808 REID (Major J. L. V.), D. S. O., Messrs. Guest Sykes (Ltd.), P. O. Box 7240, Johannesburg.

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- A2781 BRUNOT (André), Ingénieur des Ponts et Chaussées, Philippeville.
 2888 CASSAGNE, Ingénieur en chef des Ponts et Chaussées, Bône.
 A1440 VICAIRE, Inspecteur Général des Ponts et Chaussées, 20 rue Henri-Martin, Alger.

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- 2390 BLOCKER (Walther), Direktor der Paul Gresitza Akt. Ges. für Strassen und Tiefbau, Hewaldstrasse 8, Berlin-Schöneberg.
 A2622 BRIX (Josef), Geh. Reg. Rat. Prof. Dr. Ing. c. h., Ord. Prof. an der Tech. Hochschule, Kaiserdamm 109, Berlin-Charlottenburg.
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 2377 DEIDESHEIMER (F.), Kastanien Allee 3, Köln a/R.
 2729 GRUENEWALDT (Conrad de), Dr. Ingénieur, Professeur agrégé, Technische Hochschule, Karlsruhe i. B.
 2769 HENNING (Johann), Landesbaurat i. R., Saalfeld a. S.
 *2793 KRUGER (Dr. K.), Privatdozent an den technischen Hochschulen, Finowstr. 28, Neukoll-Berlin.
 2829 MALLISON (Heinrich), Prof. Dr. Phil., Lutzowstr. 33-36, Berlin W. 35.
 2835 MOLL (Dr. Kurt), Dr. Ing. Chemiker, Kleefstrasse 1 a, Hannover-Kleefeld.
 A2862 NEUMANN (Dr. Ing. E.), O. Professor Technische Hochschule, See Strasse 16, Stuttgart.
 2921 OBERBACH (Josef), Strassenbaufachmann, Nottentor 20, Soest i. W.
 A2889 OHL (Theodor), Strassenbauunternehmer, Kanalstrasse 3-4, Diez Lahn.
 A*2899 PABELICK (Franz Aug.), Kaufmann, Monkebergstr. 9, Hamburg.

A2820 SCHWABACH (Otto), Steinsetzcmeister, Landsbergstr. 32, Leipzig N. 22.

*2845 WICHERT (Dr. Ing. Paul), Leiter der Strassenbau-Forschungs-Stelle der Trinidad Lake Asphalt G. m. b. H. Kuesbeckstrasse 80-81, Berlin-Charlottenburg.

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*1842 ANON SUAREZ (Vicente), Ingeniero civil, Professor en las Universidades de La Plata y Buenos Aires, Venezuela, 1875, Buenos Aires.

*2058 ARENAS (Eduardo), Calle Pringles 379, Buenos Aires.

*1541 BARBAZAN (Antonio J.), Ingeniero Civil, Pergamino, Pcia. Buenos Aires.

*1540 BONTEMPO (Ernesto), Ingénieur civil, Pergamino, Pcia. Buenos Aires.

5035 BORDA (Julio C.), Federación Argentina de Educación Vial, Tacuari 16, Buenos Aires.

5060 BRIANO (Ing. Juan A.), Calle Gurruchaga 2175, Buenos Aires.

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*1544 DURAZONA (Valentín B.), Ingénieur civil, Estación Furo F. C. Sud, Pcia. Buenos Aires.

*1962 GERARDI (Donato), Ingénieur civil, Calle 50 No. 706, La Plata.

*1549 GIRADO (Jorge A.), Ingénieur civil, Tacuarí 939, Buenos Aires.

A*1550 GIRADO (José), Ingénieur civil, 16 Rue Franklin, Paris.

*2625 HUMET (Enrique), Ingénieur civil, 54-510, La Plata.

*1843 LAURENCENA (Alberto F.), Ingeniero Civil, Rivadavia 64, Paraná E. R.

*1546 LISSARRAGUE (Abel M.), Ingénieur civil, Mercedes, Pcia. Corrientes.

*1034 MOLINA CIVIT (Juan), Ingénieur civil, Directeur Général des Ponts et Chaussées en retraite, Calle Rodríguez Peña 1040, Buenos Aires.

*1969 MONTES (Horacio M.), Ingeniero Civil, Calle 5 No. 620, La Plata.

*1907 MOROSI (Angel), Ingénieur civil, 5-582, La Plata.

*1971 PALAZZO (Pascual), Ingeniero Civil, Avenue Forest 319, Buenos Aires.

*1548 RASETTI (Luis), Ingeniero Civil, Viel 885, Buenos Aires.

5026 REBOLLAR (Roberto E.), Ingeniero civil, Montevideo 142, Tuenman.

*1547 RESANO (Isidro), Ingeniero civil, Alsina 671, Buenos Aires.

*1543 ROMERO (Rafael), Ingeniero civil, San Fernando F. C. C. A.

*2771 ROTTA (Vicente R.), Escribano público, Santa Fé, 5200, Buenos Aires.

*2612 TAPIA (Abraham), Ingeniero civil, Calle 11 No. 1270, La Plata.

A*2346 VALLE (Juan Agustín), Ingeniero civil, Jefe Oficina de Investigaciones Carreteras, Dirección General de Puentes y Caminos, Bartolomé Mitre 1371, Buenos Aires.

AUSTRALIA

A10332 CORDREY (Russel), Neuchatel Asphalt Co., Sydney, Australia.

A2597 GILCHRIST (E. F.), City Engineer, Brisbane, Queensland.

A2577 LUKER (Sidney L.), B. Sc., Civil Engineer, A. M. I. C. E., Maintenance Engineer, Main Roads Board of New South Wales, Sydney, N. S. W.

*2516 SAMBELL (A. K. T.), 421 Collins Street, Melbourne.

A5047 STEWART (Harold), Burwood Road, Burwood, N. S. W.

*1180 WILKINSON (O. S.), Shire Engineer, Quirindi, N. S. W.

AUSTRIA

- A5052 BOCKL (Ing. W. R.), Lederergasse 17, Wien VII.
 2259 BRAUN (Leo), Ing. diplômé de construction de routes asphaltiques, Schonbrunnerstrasse 91/8, Wien.
 *2384 ENYEDY (Etienne d'), Ingénieur, Schwarzenbergplatz 7, Wien III.
 A2900 GRANICHSTADTEN (Dr. E.), Goethegasse 3, Wien.
 A2912 KAPSREITER (Gustave), Industriel Stuaß A. G., Seilerstatta 22, Wien.
 A5100 KAUG (Leo), Ingénieur, Wipplingerstrasse 24-26, Wien.
 2863 MALIK (Ing. Karel), Bauunternehmer, Hegelgasse 19, Wien I.
 A2429 MARKL (Wilhelm), Ingénieur, Schwingasse 10, Wien IV.
 *2605 SCHOITAL (Dr. Félix), Avocat et Président des Sociétés de Chaux Stockeran, Wallfischgasse 10, Wien.
 1082 WENNER (Victor), Ingénieur, Hauptstrasse 128, Wien 3.

BELGIUM—BELGICA

- 2012 ALLAËYS (A.), Ingénieur en chef Directeur des Ponts et Chaussées, 51 Rue A. Bréart, St.-Gilles-Bruxelles.
 *1861 Aoust (P. d'), Secrétaire Général du Royal Automobile-Club de Belgique, 183 Rue Frans Merjay, Bruxelles.
 1277 BATA (J.), Directeur des Travaux Publics, 82 Rue Glacière, Seraing.
 1426 BERTRAND, Ingénieur communal, Hôtel Communal, Schaarbeek-Bruxelles.
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- 2155 GROENENDAEL MARSIGNY (H. Van), Route d'Éphraïm, Angers (Maine-et-Loire).
- 1466 GROSSE (Léon), Entrepreneur de Travaux Publics, Aix-les-Bains (Savoie).
- 1948 GUERIN (Pierre), Directeur de la Société Anonyme l'Asphalte, 5 Rue Louis-Faure, Lille (Nord).
- 1333 GUIET (S.), Ingénieur en Chef du Service Vicinal, La Roche-sur-Yon (Vendée).
- 2749 GUIEU (Pierre), Éditeur, 9 Rue de l'Allogon, Paris (6^{ème}).
- 1413 GUYON GELLIN (F.), Ingénieur en Chef des Ponts et Chaussées, Gap (Hautes-Alpes).
- 1061 GUYOT (J.), Ingénieur en Chef des Ponts et Chaussées, 38 Rue du Château, Dijon (Côte d'Or).

- 1682 HAEGELEN, Ingénieur en Chef des Ponts et Chaussées, 1 Rue Taillefer, Grenoble (Isère).
- A2822 HALLADE (Jean), Ingénieur E. C. P., Entrepreneur de Travaux Publics, 14 Rue Moneey, Paris (9ème).
- 1172 HEGLY (V.), Ingénieur en Chef des Ponts et Chaussées en retraite, 31 Rue de Nancy, Metz (Moselle).
- *1513 HERMANN (Dr.), Ingénieur en Chef des Ponts et Chaussées, 4 Allée de la Meute, Le Vésinet (Seine-et-Oise).
- 1639 HOOGHWINKEL, Ingénieur Civil, Ingénieur des Mines, 54 Avenue Marceau, Paris (8ème).
- 1516 HOUBRON (André), Contrôleur à la Banque de France, 6 Avenue de la Motte-Piquet, Paris.
- 1705 HOULLIER (Paul), Ingénieur des Ponts et Chaussées, 19 Rue Millevoys, Abbeville (Somme).
- *1636 HOUPPERT, Inspecteur Général des Ponts et Chaussées, Directeur de l'Office National de Navigation, 47 Rue Cambon, Paris (10ème).
- 2833 HUBIE (Jacques), Ingénieur des Ponts et Chaussées, 3 Rue Albert de Lapparent, Paris (17ème).
- 1488 HUGUES (U.), Ingénieur en Chef des Ponts et Chaussées, 5 Boulevard Saint-Michel, Avignon (Vaucluse).
- 2395 IMBEAUX (Edouard), Ingénieur en Chef des Ponts et Chaussées en retraite, 18 Rue Emile Gallé, Nancy (Meurthe-et-Moselle).
- 2459 IMBEAUX (Pierre), Ingénieur Civil des Mines, 18 Rue Emile Gallé, Nancy (Meurthe-et-Moselle).
- 1631 JOMIER (Gaston), Ingénieur en Chef des Ponts et Chaussées, Niort (Deux-Sèvres).
- 1250 JOURDE (Raoul), Ingénieur des Ponts et Chaussées, 94 Avenue Kléber, Paris (16ème).
- 1125 KAUFFMANN, Inspecteur Général des Ponts et Chaussées, 60 Rue de Londres, Paris.
- 1936 KROMM (M. H.), Ingénieur Principal du Service Vleinal, Lesparre (Gironde).
- A2809 LABAËYE (Fernand, Jules), Ingénieur des Ponts et Chaussées, 9 Rue du Temple, Brie (Meurthe-et-Moselle).
- *1382 LACAU (Robert), Ingénieur-Conseil, Expert, 6 Rue de Vienne, Paris.
- 2679 LACROIX (Gustave), Directeur de la Société "La Route Plastique," 6 Rue Goethe, Paris (16ème).
- *1020 LAFFLY (A.), Ingénieur Constructeur, 82 Rue Vieux-Pont-de-Sèvres, Billancourt (Seine).
- 1430 LANTENOIS, Ingénieur en Chef des Ponts et Chaussées, Troyes (Aube).
- 1648 LARROQUE (J. M.), Ingénieur des Ponts et Chaussées, 22 Boulevard Matabiau, Toulouse (Haute-Garonne).
- *2492 LASSAILLY (François), Administrateur Délégué de la Société Anonyme des Etablissements Lassailly et Bichebois, 47 Rue Camille Desmoulins, Issy-les-Moulineaux (Seine).
- 1170 LAUNAY (Georges), Ingénieur des Travaux Publics de l'Etat en retraite, 18 Rue de Bagneux, Fontenay-aux-Roses (Seine).
- *1254 LECLERCQ DE PULLIGNY (J.), Inspecteur Général des Ponts et Chaussées en retraite, Antibes (Alpes-Maritimes).
- 1423 LECORNEC (F.), Inspecteur Général des Ponts et Chaussées, 11 Rue Michel-Ange, Paris (16ème).
- *2216 LEFEBVRE (Ch.), Ingénieur, Président de la Société "Salviam," 157 Boulevard Haussmann, Paris.
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- A*1015 LEGAVRIAN (P.), Inspecteur Général des Ponts et Chaussées, Professeur à l'Ecole Nationale des Ponts et Chaussées, Secrétaire Général de l'Association Internationale Permanente des Congrès de la Route, Ministère des Travaux Publics, 244 Boulevard Saint-Germain, Paris.
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- 1610 LEGRAIN, Inspecteur Général des Ponts et Chaussées, Ancien Directeur de l'Ecole Nationale des Ponts et Chaussées, 28 Rue des Saints-Pères, Paris (7ème).
- 2081 LEISEING (Gérald), Ingénieur de travaux publics, 75 Rue d'Isoudun, Bourges (Cher).

- 1044 LELIEVRE (F. C.), Ingénieur Principal du Service Vicinal faisant fonctions d'Ingénieur Ordinaire, Rue du Chevalier de la Barre, Bruy-sur-l'Escaut (Nord).
- 1293 LEROUX, Inspecteur Général des Ponts et Chaussées, Directeur Général Honoraire des Chemins de Fer de l'État, 24 Rue de Varenne, Paris.
- 1885 LEROY (P. M.), Négociant, 5 Route de la Révolte, Saint-Denis (Seine).
- 1732 LESBRE (André), Ingénieur des Ponts et Chaussées, Quai de Lesseps, Bayonne (Basses-Pyrénées).
- 1858 LESSARD (E. J.), Ingénieur, 30 Rue Diderot, Asnières (Seine).
- 1398 LEVESQUE, Inspecteur Général des Ponts et Chaussées, 4 Place des Vosges, Paris (4ème).
- 1573 LINDECKER (Albert), Administrateur de la Société des Autobus Chaumontais, Chaumont (Haute-Marne).
- A1205 LIPMANN (L.), Ingénieur en Chef des Ponts et Chaussées, 11 Rue Margueritte, Paris (17ème).
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- *1206 LOEWY (André), Ingénieur en Chef des Ponts et Chaussées, 133 Boulevard du Montparnasse, Paris (6ème).
- *1005 LOIRE (Gustave), 31 Avenue de Rigny, Bry-sur-Marne (Seine).
- 1339 LOMBARD, Ingénieur en Chef des Ponts et Chaussées à La Rochelle (Charente-Inférieure).
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- *1001 MAHIEU (A.), Sénateur, Président de l'Association Internationale Permanente des Congrès de la Route, Président du Conseil Supérieur des Chemins de fer, 16 Rue de Bourgogne, Paris (7ème).
- 2777 MALETTE (J. C.), Chef de la Section de Chimie des Laboratoires de l'Ecole Nationale des Ponts et Chaussées, 35-37 Rue Madame, Paris.
- 1556 MANGE (François), Ingénieur Civil, 41 Boulevard Magenta, Paris (10ème).
- 1101 MARCHAND (A.), Directeur du Service de la Voirie et des Eaux de la Ville de Grenoble, Passage Hôtel-de-Ville-Grenoble (Isère).
- 2903 MARGAINE (A.), Ingénieur en Chef des Ponts et Chaussées, 260 Boulevard Saint-Germain, Paris (7ème).
- 1248 MARLIO (Louis), Ingénieur en Chef des Ponts et Chaussées, 16 Avenue Bugeaud, Paris (16ème).
- *1430 MARTIN (Paul), Ingénieur en Chef des Ponts et Chaussées, Compagnie du Métropolitain, 48 Quai de la Rapée, Paris.
- 1073 MATHIEI (Charles), Directeur de la Fonderie de Saulnières, Saulnières, par Tréon, (Eure-et-Loir).
- 1612 MATHIEU (H.), Ingénieur en Chef des Ponts et Chaussées, 1 Place Garibaldi, Auch (Gers).
- 1646 MATHIEU (Ernest), Ingénieur en Chef des Ponts et Chaussées, Alençon (Orne).
- A2054 MATHIEU (Georges), Ancien Ingénieur en Chef des Travaux de Paris, Directeur à la Société Générale d'Entreprises, 39 Rue du Colisée, Paris (8ème).
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- *1002 MESNAGER (P.), Inspecteur Général des Ponts et Chaussées, 182 Rue de Rivoli, Paris (1er).
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- 1220 MIALAUD (Georges), Société des Carrières de la Meilleraie Pouzanges (Vendée).
- *2445 MICHELI (Comte Comm. Rodolfo de), Domaine de Montvert, Quartier de Montvert, Antibes (Alpes-Maritimes).
- 1270 MIELLET (Henri), Ingénieur en Chef des Ponts et Chaussées, Bourg (Ain).
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- 1043 MONET (Adolphe), Inspecteur Général des Ponts et Chaussées, 16 Avenue d'Orléans, Paris (14ème).
- *1450 MONIN (Mme. Veuve), Entreprise de Travaux Publics, 7 Rue Pelle-tier, Villeurbanne (Rhône).
- 1519 MONSARRAT, Directeur Honoraire au Ministère de l'Intérieur, 11 Place Malesherbes, Paris (17ème).
- 1221 MOREAU (P.), Ingénieur en Chef des Ponts et Chaussées, 16 Rue Morand, Besançon (Doubs).
- 2857 MURAOUR (Alexandre), Ingénieur des Constructions Civiles, Entrepreneur Travaux Routiers, "Beaulieu," Route d'Espeluche, Monté-limar (Drôme).
- 1588 NABOULET (G.), Ingénieur en Chef des Ponts et Chaussées, Mont-de-Marsan (Landes).
- *1390 NATANSON (Th.), 56 Rue du Faubourg St.-Honoré, Paris (8ème).
- 1169 NEVEUX (Gustave), Directeur des Services de la Voirie, Hôtel-de-Ville, Roubaix (Nord).
- 1050 NORV (Léon), Agent commercial du Syndicat des Carrières de Porphyre à Lessines, 50 Rue Nicolas-Leblanc, Lille (Nord).
- 1374 OURSON (H.), Ingénieur en Chef des Ponts et Chaussées, Professeur à l'Ecole Nationale des Ponts et Chaussées, 4 Place Président-Mithouard, Paris (7ème).
- 1253 PARENT (J. H.), Inspecteur Général des Ponts et Chaussées, 23 Boulevard de Latour-Maubourg, Paris (7ème).
- 1388 PARMENTIER (J.), Ingénieur en Chef des Ponts et Chaussées, 84 Rue Bonaparte, Paris (6ème).
- 1467 PERRET (Jules), Ingénieur en Chef des Ponts et Chaussées, Vannes (Morbihan).
- *1393 PETAVY (Jean), Administrateur-Directeur de la Société Anonyme des Pneumatiques Dunlop, 57 Boulevard des Batignolles, Paris (8ème).
- *1993 PEULABEUF (Louis), Entrepreneur de Travaux Publics, 6 Boulevard de Strasbourg, Arras (Pas-de-Calais).
- 1444 PIGELET (E.), Ingénieur des Ponts et Chaussées, Hesdin (Pas-de-Calais).
- 2695 PINEAU (Louis G.), Architecte, 51 bis Rue Blomet, Paris (15ème).
- A2920 PISSARD (Léon), Vice-Président de la Cie. des Freins Westinghouse, 51 Avenue Montaigne, Paris.
- 2902 PRETCEILLE (M.), 6 Rue de Laborde, Paris (8ème).
- 2826 PROMPSAL, Ingénieur des Ponts et Chaussées, 3 Avenue d'Iéna, Paris, (16ème).
- *2665 RAMY (Prosper de), Ingénieur T. P. E., 9 Boulevard Jardin Zoologique, Marseille (Bouches-du-Rhône).
- 1204 RASQUIN (Edouard), Entrepreneur de Travaux Publics, 70 Avenue de Ferrière, Rousies (Nord).
- *1302 REBUFFEL (Ch.), Président du Conseil d'Administration de la Société des Grands Travaux de Marseille, 25 Rue de Courcelles, Paris.
- 1353 RICHARD (Georges), Fondé de Pouvoirs des Carrières de St.-Chéron, 12 Rue Margueritte, Paris (17ème).
- 2896 RICHIER (Paul), Administrateur-Délégué des Etablissements Richier, 127 bis Avenue Nationale, Charleville (Ardennes).
- 2446 RINCHEVAL (Georges), Directeur Commercial de la Maison Rincheval, 1 Rue de l'Aqueduc, Paris.
- 1633 ROQUES (Louis), Ingénieur des Ponts et Chaussées, Figeac, (Lot).
- 2632 ROULLIER (E.), Ingénieur des Ponts et Chaussées, 12 Rue Dutailly, Chaumont (Haute-Marne).
- 2923 ROUSSEAU (Henri), Inspecteur Général des Ponts et Chaussées, 29 Rue Scheffer, Paris (16ème).
- 1069 ROUSSEAU (Paul), Rédacteur au "Temps," 14 Rue du Helder, Paris (9ème).
- *1500 ROUVILLE (A. de), Ingénieur en Chef des Ponts et Chaussées, Directeur du Service des Phares et Balises, 13 Avenue du Président-Wilson, Paris (16ème).
- *1505 SAIGNAT (A.), Entrepreneur de Travaux Publics, 68 Rue Molière, Ivry-sur-Seine (Seine).
- 2778 SALGUES (S.), Ingénieur des Ponts et Chaussées, 10 Rue des Salinques, Foix (Ariège).
- 2250 SALOMON (Robert), Ingénieur Civil, 34 Rue des Halles, Paris (1er).
- 1202 SAUNIER (Honoré), Ingénieur Principal du Service Vicinal, 2 Rue Casimir-Périer, Le Havre (Seine-Inférieure).

- 2422 SCHARS (Alphonse), Ingénieur-Constructeur, 48 Rue Achard, Bordeaux (Gironde).
- 2483 SCHARS (Arnand), Ajusteur Mécanicien, 48 Rue Achard, Bordeaux (Gironde).
- 2437 SCHILLES (Albert), Ingénieur, 1 Rue Milton, Paris (9ème).
- 1468 SCHWARTZ, Ingénieur en Chef des Ponts et Chaussées, Melun, (Seine-et-Marne).
- 1940 SECRETAIRE GENERAL, A MARSEILLE, DE LA SOCIETE DES GRANDS TRAVAUX DE MARSEILLE, 16 Boulevard Notre-Dame, Marseille (Bouches-du-Rhône).
- 1273 SENTENAC, Ingénieur en Chef des Ponts et Chaussées, 9 Boulevard Port-Royal, Paris (13ème).
- 1414 SIMON (P.), Ingénieur en Chef des Ponts et Chaussées, Grenoble (Isère).
- *1524 SOLEIL (G.), Ingénieur en Chef des Ponts et Chaussées, Compiègne (Oise).
- 1275 STOCLET, Inspecteur Général des Ponts et Chaussées, 148 Boulevard Montparnasse, Paris.
- 1981 STRUBE (Henri), Constructeur-Mécanicien, 17 Rue Hortense, Montrouge (Seine).
- 2886 SUREAU (M. H.), Entrepreneur de Travaux Publics, 24 Boulevard Barbès, Paris.
- 1980 TARDIEU (Roger), Ingénieur des Arts et Manufactures, 2 Rue d'Alsace, Clichy (Seine).
- 1363 TARTRAT, Inspecteur Général des Ponts et Chaussées, 66 Boulevard Raspail, Paris.
- 1434 TERRISSE (Henri), Ingénieur des Ponts et Chaussées, 69 Avenue de Ségur, Paris (7ème).
- *1628 THIERY (M.), Ingénieur en Chef des Ponts et Chaussées, 4 Place de la République, Strasbourg (Bas-Rhin).
- *1369 THIOLLIERE (Antoine), Ingénieur en Chef des Ponts et Chaussées, Saint-Etienne (Loire).
- 1080 THOMAS (François), Ingénieur Principal du Service Vicinal, 7 bis Rue Stappaert, Lille (Nord).
- 2156 THOMAS, Ingénieur Civil, 67 Avenue de Ségur, Paris (7ème).
- 1489 THUILLIER (Joseph), Ingénieur des Ponts et Chaussées, 2 Avenue du Colonel Bonnet, Paris.
- 1227 TRAVERSINI (E), Industriel, 175 Boulevard Malesherbes, Paris (17ème).
- A1496 TREHARD (H.), Ingénieur des T. P. E., 21 Rue Carpeaux, Courbevoie (Seine).
- A2401 TROUIS (Emile), Ingénieur des Ponts et Chaussées en congé, 222 Boulevard Péreire, Paris.
- A*2882 TRUFFOT (Jean), Ingénieur des Ponts et Chaussées, 11 Rue Jacquemont, Paris (17ème).
- 1272 USUREAU (P.), Entrepreneur de cylindrages à vapeur, 53 bis Rue du Bellay, Angers (Maine-et-Loire).
- 2227 VALENTIN (H. P.), Ingénieur des Ponts et Chaussées, Moulins (Allier).
- *2222 VALLEE (M. G.), Ingénieur T. P. E., Dammarin-en-Goele (Seine-et-Marne).
- 1418 VARVIER, Ingénieur en Chef des Ponts et Chaussées, 9 Rue Grolée, Lyon (Rhône).
- 1252 VASSEUR (Louis), Inspecteur Général des Ponts et Chaussées, 42 Rue de la Pompe, Paris (16ème).
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- 1448 VAURS (Albert), Ingénieur en Chef du Service Vicinal, Clermont-Ferrand (Puy-de-Dôme).
- 1334 VERGER (Casimir), Ingénieur T. P. E., 4 Cours Marigny, Vincennes (Seine).
- A2823 VERNOT (Marcel), Ingénieur T. P. E., Chef du Secrétariat et de la Comptabilité de l'A. I. P. C. R., 241 Rue du Faubourg St.-Martin, Paris.
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- *1483 VERSILLÉ (J.), Entrepreneur de Travaux Publics, 4 Chaussée de la Muette, Paris (16ème).

- *1484 VERSILLE (Pierre), Entrepreneur de Travaux Publics, 30 Rue Michel-Ange, Paris (16ème).
- *2316 VITRY (Adrien de), Ingénieur des Ponts et Chaussées, Orléans (Loiret).
- *1077 VITURAT (Claude), Entrepreneur de Travaux Publics, 59 Rue de Javel, Paris (15ème).
- A*2153 WAGNER (Ernest), Ingénieur Directeur de la Compagnie Générale de Signalisation, 23 Rue d'Athènes, Paris (9ème).
- 1400 WAHL (Paul), Ingénieur en Chef des Ponts et Chaussées, Macon (Saône-et-Loire).
- *1611 WATIER, Inspecteur Général des Ponts et Chaussées, Directeur des Voies Navigables et des Ports Maritimes au Ministère des Travaux Publics, 244 Boulevard St.-Germain, Paris (7ème).
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- 1886 BARFORD (W. G.), Barford and Perkins (Ltd.), Engineers, Peterborough.
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- *1925 BEADLE (Herbert E.), Road Maker, 12 Cannon Row, Westminster, London S. W. 1.
- *2325 BENNETT (S. A.), A. M. I. C. E., F. S. I., County Surveyor, Monmouthshire County Council, County Hall, Newport-Mon.
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- 1875 DONALDSON (George), County Road Surveyor "Westholm," Milton Road, Kirkcaldy.
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- *1606 DURHAM (Frank R.), O. B. E., C., A. M. Inst. C. E., Director of Works, Imperial War Graves Commission, 28 Cumberland Road, Kew Surrey.

- 1770 DYER (R. H.), Borough Surveyor, Surveyor's Office, Southend on Sea.
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- *2517 EVANS (Maj. S.), Ministry of Transport, 6 Richmond Terrace, Cardiff.
- 2545 FERGUSON (H. J.), Electric Tramway & Railway Journal, 37-38 Strand, London W. C. 2.
- *1891 FLEMING (W. G.), 31 Robertson Street, Glasgow.
- A2599 FOX (Charles G.), 61 St. Mary Axe, London E. C. 3.
- A2575 FREEMAN (W.), care of The Texas Oil Co. (Ltd.), 125-130 Strand, London W. C.
- A2581 FROOD (Robert), "Earnock" Dalziel Drive Pollokshields, Glasgow.
- 2586 GAISMAN (Lucien), Managing Director of Universal Rubber Paviers (Ltd.), Springbank House, Woodler (Cheshire).
- *2413 GANN (Thomas), Archeologist, care of Royal Aero-Club, London.
- 2546 GARNER (F. H.), 20 Ashley Mansions, Victoria, London S. W. 1.
- *1286 GRACE (Henry Jinks), Managing Director Enderby and Stoney Stanton Granite Co. (Ltd.), Enderby near Leicester.
- 1773 GRAY (Charles C.), 122 George Street, Edinburgh.
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- *2370 GUERITTE (T. J.), Monchel and Partners, 38 Victoria Street, London S. W. 1.
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- *2218 HINES (Maj. J. T.), O. B. E. M. C. of the Golfers' Club, Whitehall, London S. W. 1.
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- *2555 KINGHORN (A. F.), 98 West George Street, Glasgow C. 2.
- *2235 KINSEY (William J.), Joshua Schofield & Sons (Ltd.), Hill Croft, Pinfold Lane, Romiley, Stockport.
- 2564 KNIGHT (T.), Ministry of Transport, 1 Park Place, Leeds.

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- *2502 MACLAY (D. B.), City Engineer of the Municipality of Singapore, care of Peirce & Williams, 64 Victoria Street, London S. W. 1.
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- *1443 MEILANDT (Henry Stanley), "Melville," Nuthurst, Horsham, Sussex.
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- *1717 PEPLER (George Lionel), F. S. I., M. T. P. I., Chief Town Planning Inspector, Ministry of Health, Whitehall, London S. W. 1.
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- A2533 PRATT (E. A.), Trinidad Lake Asphalt Overseas (Ltd.), Adelphi Terrace 4, London W. C. 2.
- *2531 PRIESTWICH (R. G.), care of William Prestwich & Sons (Ltd.), Dronfield, Sheffield.
- 1873 PREVITE (Col. E. J.), 292 Winchester House, London E. C. 2.
- *2336 RAWSON (Sir Cooper), M. P., House of Commons, London S. W. 1.
- A*2509 REES (F. William), Cumbrey, Cheltenham.
- *2237 RHODES (W. Cecil), care of Highways Construction (Ltd.), Iddesleigh House, Caxton Street, Westminster, London S. W. 1.
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- 1791 SMITH (P. Everard), Canada House, Baldwin Street, Bristol.
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- 1833 SMITH (J. C. B.), Yorkshire Road, Tar Binders (Ltd.), 26 Park Place, Leeds.
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 *2289 WAKE (John F.), 123 Victoria Road, Darlington.
 *2239 WALKER (J. H.), M. Inst. C. E., Secretary of The Walker Weston Co. (Ltd.), 75 Victoria Street, London S. W. 1.
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 A*1009 WOOD (Francis), M. Inst. C. E., F. G. S., Borough Engineer, Blackpool.
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 *2627 MAKINO (Utanojo), Engineer Doboku Kioku, Naimusho, Tokyo.
 2860 MIKI (Eizo), Chemical Engineer, Research Laboratory, Department of Home Affairs, 439 Kashiwagi, Yodobashi-Machi, Tokyo.
 *1911 MONIWA (Chujiro), Doctor of Engineering, Bureau of Public Works, Home Department, Tokyo.
 *1932 MORI (Toyokichi), Civil Engineer, Asphalt Department, Nihonsekiyu, Tokyo.
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 *1536 SAGAMI (Nobuichi), Civil Officier, care of Naimusho, Tokyo.
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 *1492 TAKAKUWA (T.), Professeur of Kiriu Technical College, Kiriu, Gummakura.
 *1931 YAMAMOTO (Toru), Paving Engineer, Roads Department, Tokio Municipal Office, Tokyo.
 *1933 YATSUI (Yon-suke), City Engineer, Roads Department, City of Tokio, Tokyo.

LATVIA

- *2242 SIKSNE (Alexandre), Ingénieur, Directeur du Département des Ponts et Chaussées, Professeur agrégé à l'Université de Lettonie, Ministère des Communications, Riga.

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PALESTINE—PALESTINA

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PARAGUAY

- 5061 BOBROVSKY (Ing. Sergio), Avenida Colombia 1946, Asunción.

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- 1263 BAETEN (Henri), Industriel, 74 Chaussée de Bruxelles, Maastricht.
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 *1478 BONGAERTS (C. E.), Ingénieur en Chef des Ponts et Chaussées, Juliana Van Stelberglaan, s' Gravenhage.
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- 1231 SCHLINGEMAN, Ingénieur van den Rijkswaterstaat, Riouwstraat 133, 's Gravenhage.
- 1859 SMITS (J. J. L.), Directeur van het Electriciteits en Frambedrijf, Willem d/Zwijgerstraat, Utrecht.
- *1327 STEFFELAAR (L. C.), Van Beuningerstraat 7, 's Gravenhage.
- *1325 STEVENS (Raymond), Directeur de l'Usine de Créosotage des Bois, Grotte-Wittenburgerstraat 110, Amsterdam.
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- *1883 VAN DEN BERG (W.), Directeur de la Société Anonyme, Utrechtse Asphaltfabrick, Bollelaan 1, Naarden.
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- 1205 VAN OPPEN (L. B. J.), Bourgmestre de Maastricht, Hôtel de Ville, Maastricht.
- *2901 VILDER (A. F. de), Directeur de Amsterdamsche Ballast Maatschappij, Prins Hendrikkade 134, Amsterdam.
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- A2906 ZANEN (Pieter C.), Directeur de la Société Anonyme d'entreprises, Boerhannestraat, Tilburg.

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- *1975 KASILAG (Marcial), Chief Constructing Engineer, Bureau of Public Works, Manila.
- *1531 SALLEBY (N. S.), Highway Engineer, Government of the Philippine Islands, Manila.
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 2184 BIELSKI (Roman), Ingénieur diplômé, Justo (Woj. Krakowski).
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 2208 BRZOZOWSKI (Stanislas), Ingénieur, Professeur adjoint, à l'Ecole Polytechnique, Lwów.
 2185 BUKASIEWICZ (Stanisław), Nowy Sącz (Woj. Krakowski).
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- 2392 JURZYKOWSKI (Arnold), Ingénieur, 17 Rue Florjanska, Kraków.
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- 2738 KLEINER (Bronislaw), Ingénieur des Ponts et Chaussées, Krosno (Woj. Lwowskié).
- 2878 KOKUSZYN (Włodzimiers), Ingénieur, Dep. Drog. Minist. Robot Publicznych, Kredytowa 9, Warszawa.
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- 2142 KRUG (Kazimierz), Ingénieur, Directeur des Travaux Publics du Département Kielce, Ulica Mickiewicza, Kielce.
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- 2090 PACLAŃSKI (Jan), Ingénieur, Ulica Hipoteeczna, Kielce.
- 2097 PANEK (Michał), Ingénieur, Powiatowy Zarząd Drogowy, Włocławek (Woj. Warszawski).
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[Los nombres de los Miembros que han asistido al VI. Congreso están precedidos de la letra A]

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